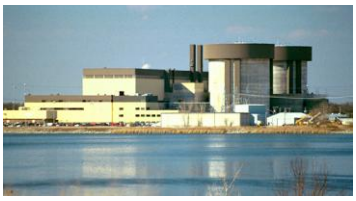
JASPER County Ingestion Pathway Plan

DRAFT – March 15, 2012

Palisades

Braidwood Station



D.C. Cook

Dresden Station

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EXECUTIVE SUMMARY

JASPER County Ingestion Pathway Plan

Jasper County has witnessed a whole host of hazards that have impacted citizens and communities and which test our ability to provide life safety and property protection measures. That is why the Jasper County Emergency Management Agency has developed this document, the *Jasper County Ingestion Pathway Plan*.

This document will act as a guide to explain how county response agencies will effectively meet the challenges and demands following a radiological incident that occurs at a one of the four nuclear power facilities that may have significant impact on northern Indiana's agricultural operations and general food supplies.

The *Jasper County Ingestion Pathway Plan* is not to be considered a stand-alone document, but merely an extension or support document to the County Comprehensive Emergency Management Plan, which covers a wide variety of hazards that may also significantly impact Jasper County.

The *Jasper County Ingestion Pathway Plan* is comprised of an administrative section which discusses the concept of the plan and the threat or risk that county faces with regard to incidents that may impact Indiana's water and food supplies. The Plan also provides a series response tasks for each of the County Emergency Support Functions (ESFs). ESFs are a collection of county response agencies that may come together to share resources, information and personnel during times of crisis.

These response tasks cover such issues as Alert and Notification, Restriction of Movement, and Containment and Decontamination to name a few.

It is vitally important that this document and other emergency planning materials developed for the County be reviewed, exercised and tested on a regular basis to ensure the residents and communities here within Jasper County have the best possible resources for an effective response to any hazards we may face.

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INTRODUCTION

Purpose

The purpose of this document is to outline the process and key actions needed to respond to ingestion pathway incidents that may occur with the borders of Jasper County.

Mission

Jasper County public safety agencies, with coordination from the Emergency Management Agency, will strive to build, maintain and promote a system to effectively mitigate against, prepare for, respond to, and recover from the challenges and demands of hazards which could potentially impact our citizens and communities.

Applicability

This plan applies to those county policy makers, agencies and departments that have roles and responsibilities, both primary and support, as identified in the Jasper County Comprehensive Emergency Management Plan. These agencies include, but are not limited to:

- Jasper County Board of Commissioners
- Jasper County Emergency Management Agency
- Jasper County Health Department
- Jasper County Sheriff's Department
- Jasper County Highway Department
- NW Indiana Chapter – American Red Cross
- Municipal Water and Sewage Department
- Rensselaer School Corporation
- Kankakee Valley School Corporation
- Tri-County School Corporation

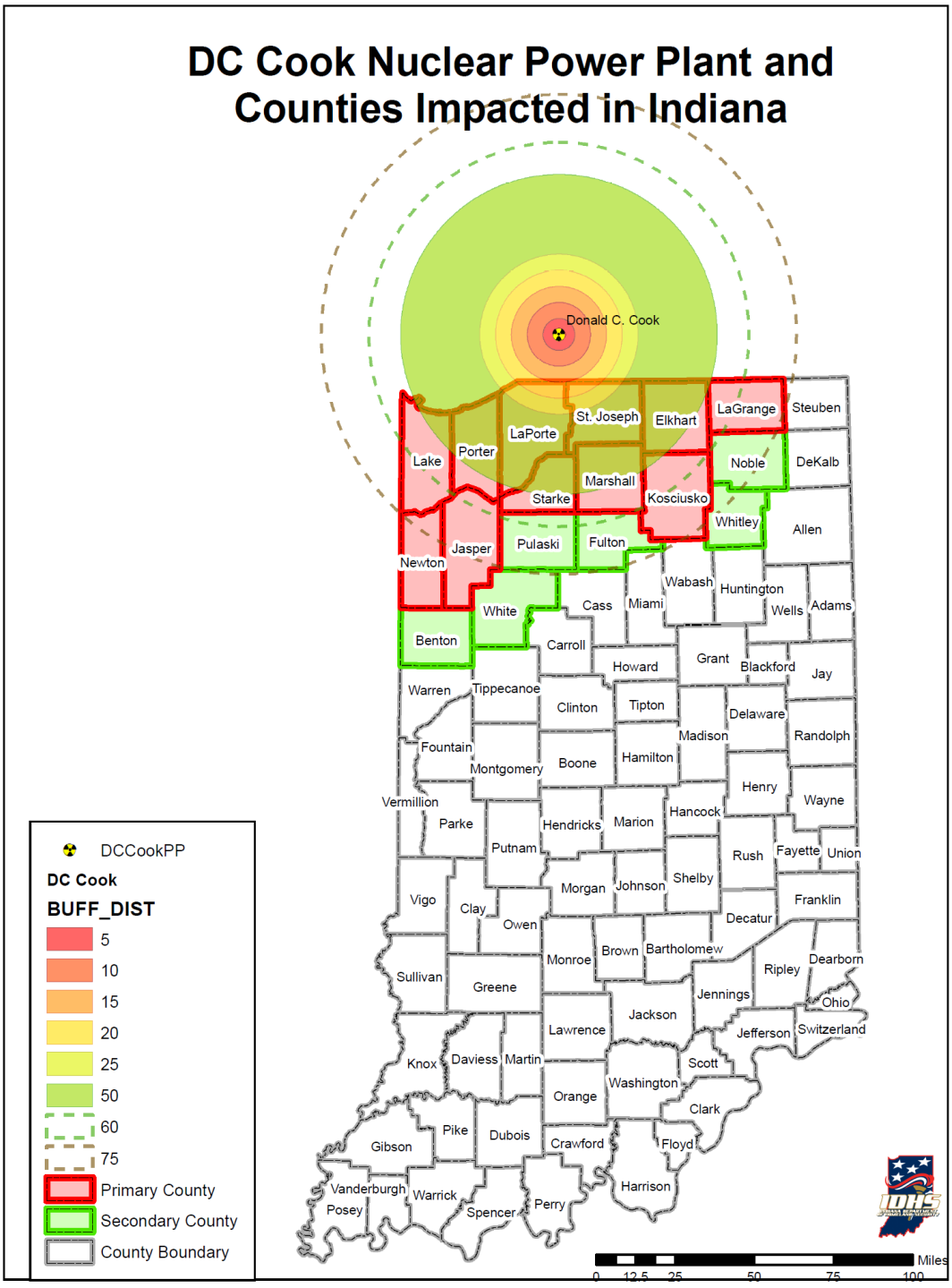
Scope

This Plan may be activated in conjunction with or in support of the Jasper County Comprehensive Emergency Management Plan to begin the response phase to address the impact of events caused by the release of radioactive material into the environment from nuclear power plants in the states of Illinois and Michigan, which have the potential to impact water supplies, crops, livestock, and other food sources in the following 11 counties in Northern Indiana: Elkhart, Jasper, Koscuisko, LaGrange, Lake, LaPorte, Marshall, Newton, Porter, St. Joseph, and Starke.

The following is a brief description of those facilities which may impact Jasper County and other Indiana communities:

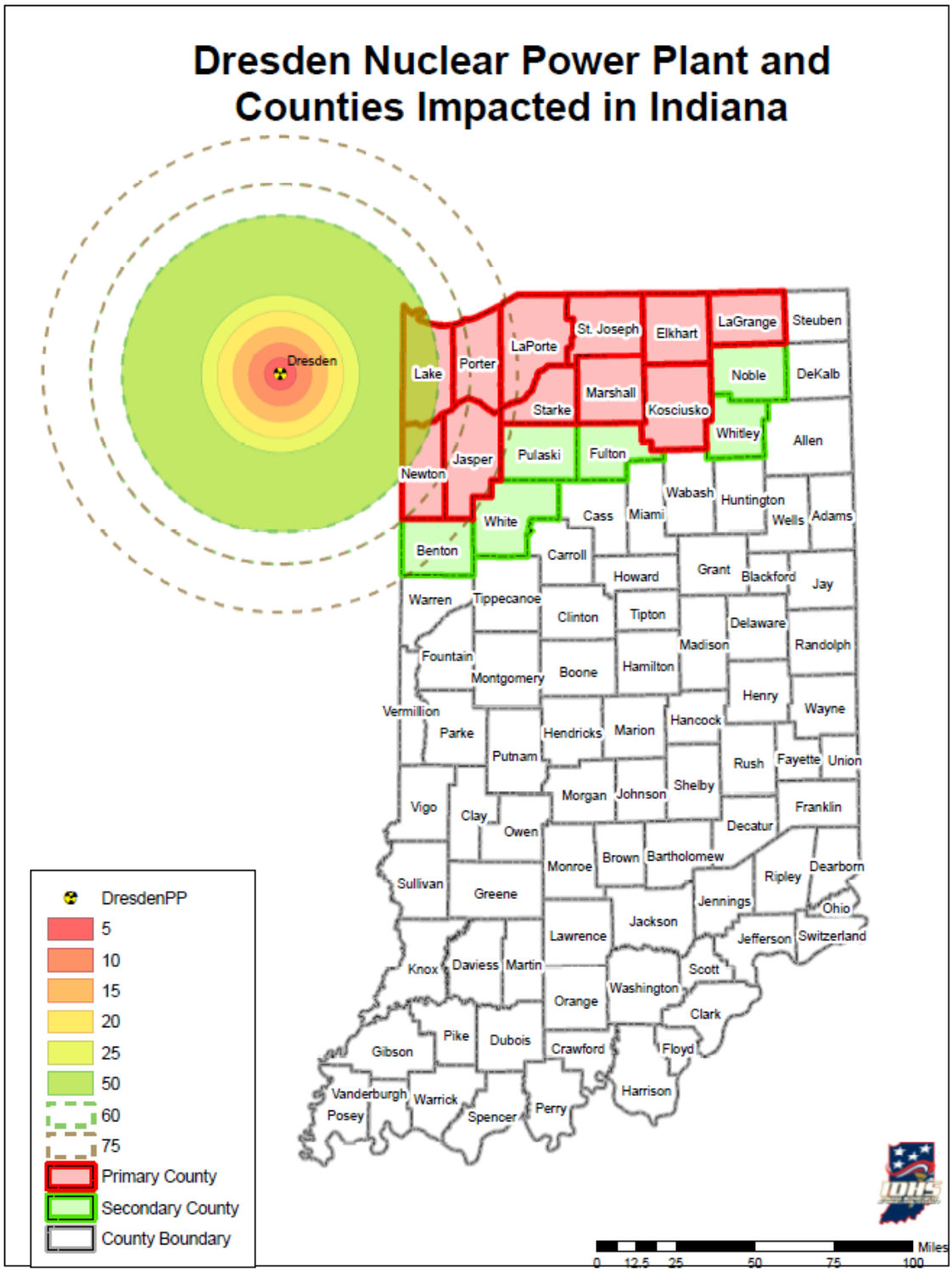
A. Donald C. Cook Nuclear Plant

The Cook Nuclear Plant has two pressurized water reactors (PWRs), with 1,056 megawatt and 1,100 megawatt capacity, owned by American Electric Power. The units are located 12.5 miles north of Indiana near Bridgman, Michigan.



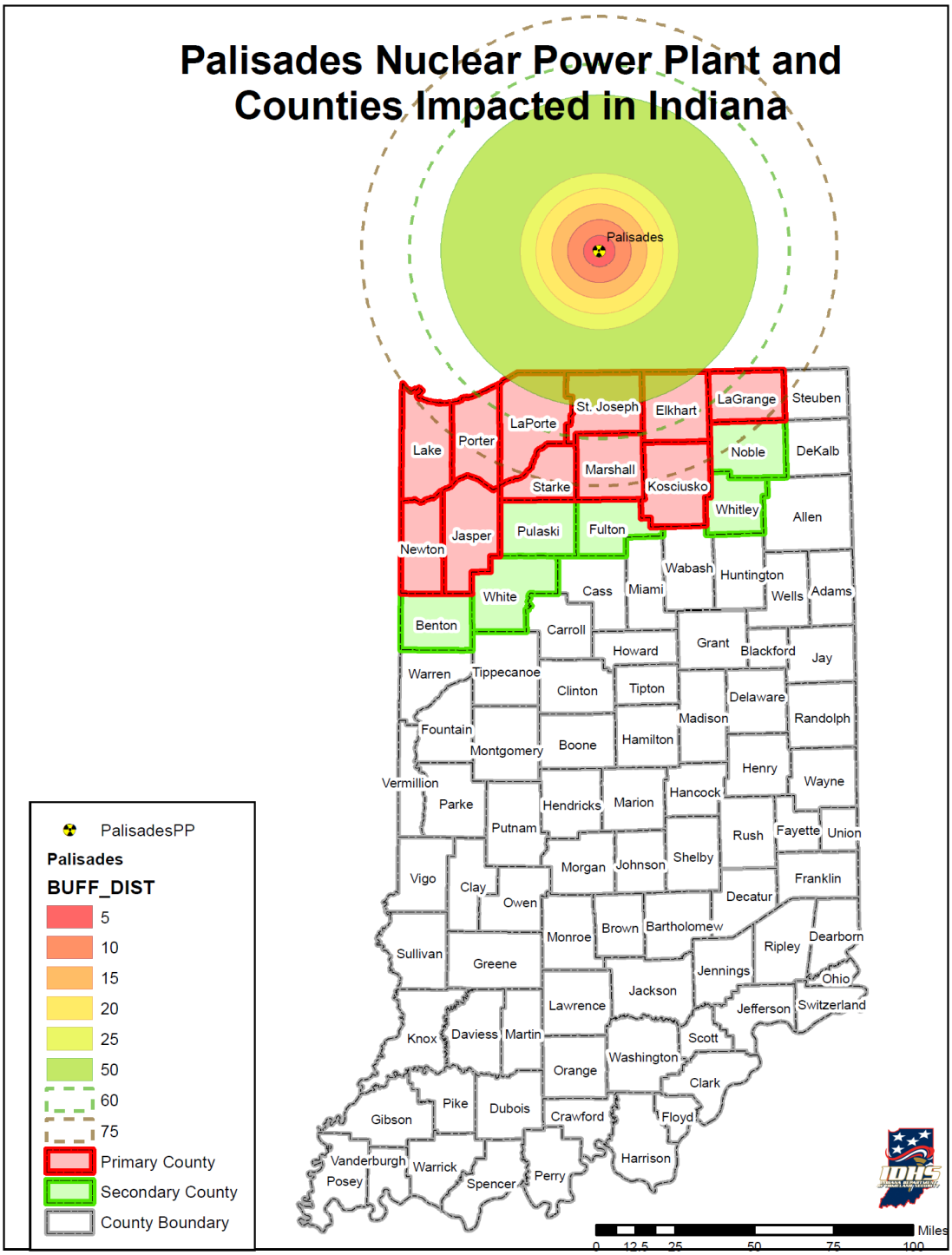
B. Dresden Generating Station

The Dresden Generating Station has two 794 megawatt boiling water reactors (BWRs) owned by Exelon Generation. The units are located 38 miles west of Indiana in Morris, Illinois.



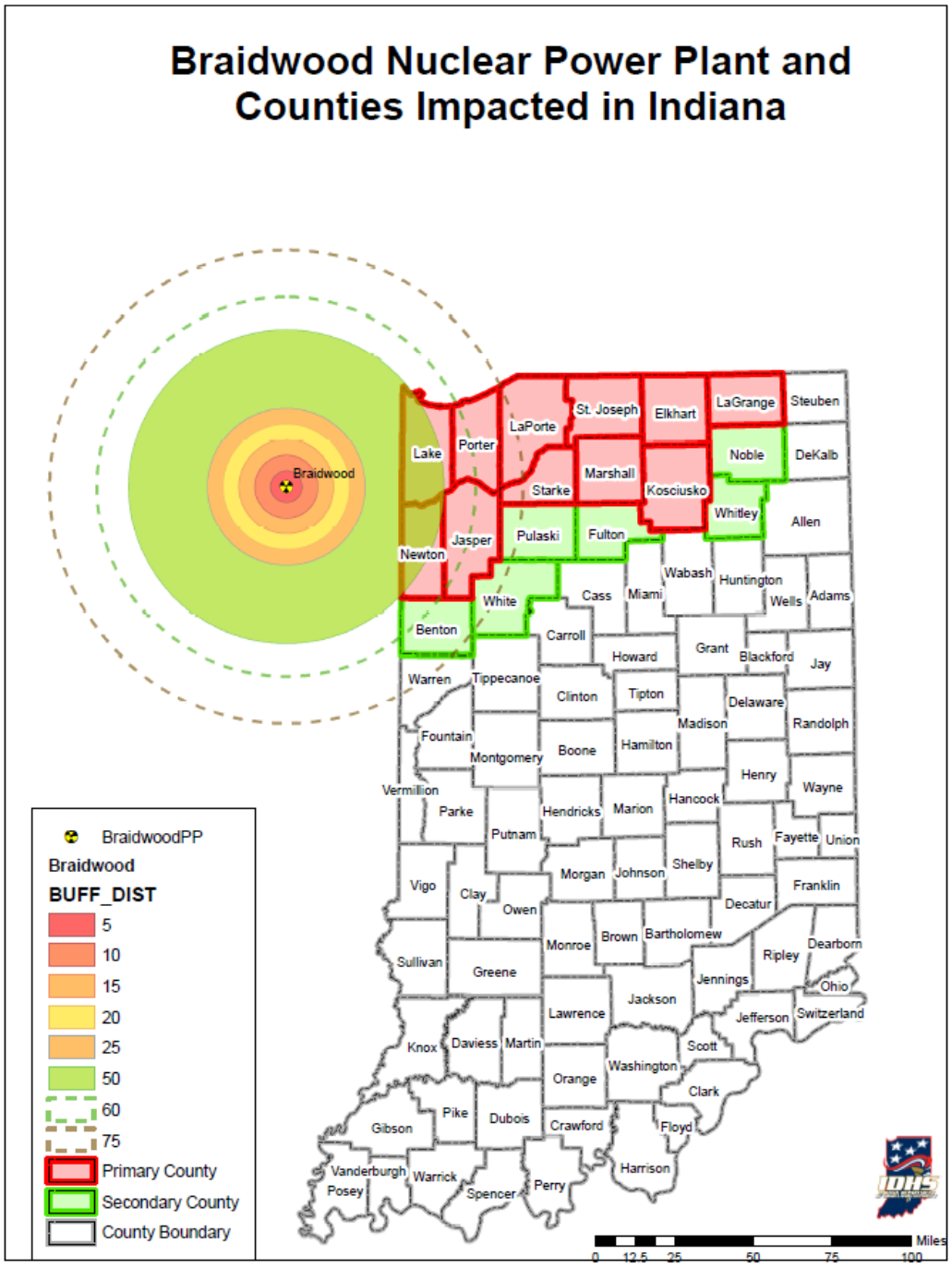
C. Palisades Power Plant

The Palisades Power Plant is a 768 megawatt pressurized water reactor (PWR) owned by the Entergy Corporation. The unit is located 39.2 miles north of Indiana near Covert, Michigan.



D. Braidwood Generating Station

The Braidwood Generating Station has two 1,120 megawatt pressurized water reactors (PWRs) owned by Exelon Generation. The units are located 31.5 miles west of Indiana near Braidwood, Illinois.



Key Planning Considerations

A. Situation

Many hazards threaten Indiana, which may cause emergencies in all, or portions of the State. This plan specifically covers the hazard and risk associated with a nuclear power plant incident which may impact the Jasper County food supply based upon its proximity to several Jasper County facilities.

1. An Ingestion Emergency Planning Zone, or Ingestion EPZ, is an area within a fifty-mile radius of a nuclear power plant. This distance is based upon the expectation that in a probable worst case emergency, any radiation levels out at a distance of more than fifty miles from a plant would not pose an ingestion problem.

2. Jasper County is located in the northwest portion of Indiana. Lake and Porter County bounds it to the North, Pulaski County borders it on the east, Newton County to the west, and White Counties border it to the South. Jasper County encompasses over 570 square miles.

3. According to the US Census Department's 2009 estimates, the population of Jasper County was 33,000. The highest concentrations of residents live near the City of Demotte and secondly the City of Rensselaer.

4. Jasper County has, like most Indiana counties, at-risk and vulnerable populations, which will require special attention and alternate consideration in such key actions as transportation, evacuation, feeding, and medical care.

5. The economic base of Jasper County is mostly Agricultural.

6. State road 231 passes through the entire length of Jasper County, north and south, and State Road 49 lies in the NE Corner of Jasper County, while State roads 10, 14, 16, 24, and 114 run east and west through the County. I-65 is also located in Jasper County with five different exit locations. Amtrak, TP & W, CSX Transportation, and Santa Fe railroad operate the tracks that pass through Jasper County. Jasper County Airport is located on Hwy. 114 two miles west of Rensselaer.

B. Assumptions

In order for successful operations to take place, the following key planning assumptions are listed as a means to gauge the current level of participation and support provided by County stakeholders and responsible agencies:

1. Jasper County and its political subdivisions have a number of capabilities including manpower, equipment, supplies, and the skills that can be used to address the operational concerns in an ingestion pathway incident where federal and state assets may also play a significant response and coordination role.

2. Training, testing and evaluation of the essential agencies and departments within the County will be an ongoing priority in order for the best possible response to an ingestion pathway incident. As a matter of policy, the Federal Emergency Management Agency (FEMA), U.S. Department of Energy, (US DOE), the Nuclear Regulatory Commission (NRC), the Indiana Department of Homeland Security (IDHS), and those four facilities in Illinois and Michigan that are within the 50-mile Ingestion EPZ with Indiana, conduct a full-scale exercise every six years. This exercise, based upon FEMA and DOE standards, examines the ability of federal, state, and local agencies to alert the public, identify the potential radiological hazards and their impacts, and administer the appropriate protective measures to eliminate or lessen the exposure to the food supply.

3. In the event of an ingestion pathway incident, Jasper County personnel, who have been adequately trained, are expected to play a critical role in the sampling and containment of radiological materials that may be introduced into the environment.

4. The appropriate levels of alert, warning and notification will take place utilizing the County Warning Point, the media, and other available sources. The County will utilize or develop the appropriate Emergency Warning Plan, as needed.

5. Local agencies and departments within the County will complete their assigned responsibilities as outlined in this Plan in coordination with state and federal agencies that will be assuming a large, operational role in areas that may be affected by an ingestion pathway incident.

6. If a disaster declaration is made, the State of Indiana may provide funds to Jasper County, in additional to the direct technical and operational support for containment and decontamination. These funds may likely be dependent upon analysis and assessment conducted within impacted areas of the County.

7. Federal agencies may also provide assistance, which may consist of monitoring and sampling support to existing state and local teams within Indiana.

8. Before, during and after significant events, it is likely that the Homeland Security District Coordinator assigned to District One, of which Jasper County belongs, may be available as a resource for discussion, consultation and support. He or she may also act as a direct link to the State Emergency Operations Center (EOC) to relay specific incident information as well as any resource requests during and after the ingestion pathway incident.

9. Additional sampling and monitoring teams from the State and other jurisdictions should not come into Jasper County until such time as it is determined that these assets may be needed for continued or ongoing sampling, decontamination, or environmental monitoring.

10. The likelihood that this ingestion pathway incident is occurring elsewhere or will occur in other portions of the state is highly likely. Subsequently, county agencies and officials must assume that external resources, primarily from the State, may not be available for up to 72 hours after an incident occurs.

Statement of Risk

Jasper County and its residents are at risk of potential exposure to radioactive materials should containment fail. An incident such this, although rare, has occurred in the United States with the 1979 accident of the Three Mile Island Nuclear Facility in Harrisburg, Pennsylvania and in the former Soviet Union at the Chernobyl Nuclear Facility in 1986 near the city of Kiev, Ukraine.

A. Three Mile Island Accident – Overview

The accident at the Three Mile Island Unit 2 (TMI-2) nuclear power plant near Middletown and Harrisburg, Pa., on March 28, 1979, was the most serious in U.S. commercial nuclear power plant operating history, even though it led to no deaths or injuries to plant workers or members of the nearby community. But it brought about sweeping changes involving emergency response planning, reactor operator training, human factors engineering, radiation protection, and many other areas of nuclear power plant operations. It also caused the U.S. Nuclear Regulatory Commission to tighten and heighten its regulatory oversight. Resultant changes in the nuclear power industry and at the NRC had the effect of enhancing safety.

The sequence of certain events – equipment malfunctions, design-related problems and worker errors – led to a partial meltdown of the TMI-2 reactor core but only very small off-site releases of radioactivity.

Detailed studies of the radiological consequences of the accident have been conducted by the NRC, the Environmental Protection Agency, the Department of Health, Education and Welfare (now Health and Human Services), the Department of Energy, and the State of Pa.. Several independent studies have also been conducted. Estimates are that the average dose to about 2 million people in the area was only about 1 millirem.

To put this into context, exposure from a chest x-ray is about 6 millirems. Compared to the natural radioactive background dose of about 100-125 millirem per year for the area, the collective dose to the community from the accident was very small. The maximum dose to a person at the site boundary would have been less than 100 millirems.

In the months following the accident, although questions were raised about possible adverse effects from radiation on human, animal, and plant life in the TMI area, none could be directly correlated to the accident. Thousands of environmental samples of air, water, milk, vegetation, soil, and foodstuffs were collected by various groups monitoring the area. Very low levels of radionuclides could be attributed to releases from the accident. However, comprehensive investigations and assessments by several well-respected organizations have concluded that in spite of serious damage to the reactor, most of the radiation was contained and that the actual release had negligible effects on the physical health of individuals or the environment.

B. Chernobyl Nuclear Accident – Overview

On April 26, 1986, an accident occurred at Unit 4 of the nuclear power station at Chernobyl, Ukraine, in the former USSR. The accident, caused by a sudden surge of power, destroyed the reactor and released massive amounts of radioactive material into the environment.

To stop the fire and prevent a criticality accident as well as any further substantial release of fission products, boron and sand were poured on the reactor from the air. In addition, the damaged unit was entombed in a temporary concrete "sarcophagus," to limit further release of radioactive material. Control measures to reduce radioactive contamination at and near the plant site included cutting down and burying a pine forest of approximately 1 square mile. The three other units of the four-unit Chernobyl nuclear power station were subsequently restarted. The Soviet nuclear power authorities presented an initial report on the accident at an International Atomic Energy Agency (IAEA) meeting in Vienna, Austria, in August 1986.

After the accident, access to the area in a 30-kilometer (18-mile) radius around the plant was closed, except for persons requiring official access to the plant and to the immediate area for evaluating and dealing with the consequences of the accident and operation of the undamaged units. The population evacuated from the most heavily contaminated areas numbered approximately 116,000 in 1986 and another 230,000 people in subsequent years.

The Chernobyl accident caused many severe radiation effects almost immediately. Among the approximately 600 workers present on the site at the time of the accident, 2 died within hours of the reactor explosion and 134 received high radiation doses and suffered from acute radiation sickness. Of these, twenty eight workers died in the first four months after the accident.

Another 200,000 recovery workers involved in the initial cleanup work of 1986-1987 received doses of between 0.01 and 0.50 Gy. The number of workers involved in cleanup activities at Chernobyl rose to 600,000, although only a small fraction of these workers were exposed to dangerous levels of radiation. Both groups of cleanup and recovery workers may become ill because of their radiation exposure, so their health is being monitored.

The Chernobyl accident also resulted in widespread contamination in areas of Belarus, the Russian Federation, and Ukraine inhabited by millions of residents. Radiation exposure to residents evacuated from areas heavily contaminated by radioactive material from the Chernobyl accident also has been a concern. Average doses to Ukrainian and Belarusian evacuees were 17 mSv and 31 mSv, respectively. Individual exposures ranged from a low of 0.1 to 380 mSv. However, the majority of the five million residents living in contaminated areas received very small radiation doses which are comparable to natural background levels (1 mSv per year).

The health of these residents also has been monitored since 1986, and to date there is no strong evidence for radiation-induced increases of leukemia or solid cancer (other than thyroid cancer). An exception is a large number of children and adolescents who in 1986 received substantial radiation doses in the thyroid after drinking milk contaminated with radioactive iodine. To date, about 4,000 thyroid cancer cases have been detected among these children. Although 99% of these children were successfully treated, nine children and adolescents in the three countries died from thyroid cancer.

Fortunately, no evidence of any effect on the number of adverse pregnancy outcomes, delivery complications, stillbirths or overall health of children has been observed among the families living in the most contaminated areas.

Apart from the increase in thyroid cancer after childhood exposure, no increase in overall cancer or non-cancer diseases have been observed that can be attributed to the Chernobyl accident and exposure to radiation. However, it is estimated that approximately 4,000 radiation-related cancer deaths may eventually be attributed to the Chernobyl accident over the lifetime of the 200,000 emergency workers, 116,000 evacuees, and 270,000 residents living in the most contaminated areas. This estimate is far lower than initial speculations that radiation exposure would claim tens of thousands of lives, but it is not greatly different from estimates made in 1986 by Soviet scientists.

Pripyat, the town near Chernobyl where most of the workers at the plant lived before the 1986 accident, was evacuated because of radiological contamination. It was included in the 30-km Exclusion Zone around the plant and is closed to all but those with authorized access.

C. Impact to Indiana Counties

With the potential for exposure to the environment and to food sources, the table on the next page shows those counties within Indiana that are within the Ingestion Pathway EPZ and the estimated populations that could be impacted by such an incident.

Name of Facility/Location	Counties Impacted in Indiana	Estimated Population of Area*
Donald C. Cook Nuclear Plant/Bridgeman, MI	Elkhart	197,559
	Kosciusko	4,787
	LaGrange	7,857
	Lake	200,092
	LaPorte	111,467
	Marshall	19,658
	Porter	164,343
	St. Joseph	266,931
	Stark	23,363
Dresden Generating Station/Morris, IL	Lake	332,324
	Newton	2,693
Palisades Power Plant/Covert, MI	Elkhart	54,300
	LaPorte	1,815
	St. Joseph	162,099
Braidwood Generating Station/Braidwood, IL	Lake	496,005
	Newton	14,244

**2010 estimate from the U.S. Census Bureau.*

Statement of Limitations

Although the potential for an ingestion pathway incident to occur is unlikely, steps to ensure public understanding of such incidents will impact how citizens will react and how they comply with the orders of public safety personnel. It will be essential that adequate alert, warning and notification will be very important to reduce possible injuries or fatalities. Alert and notification will be vital for the activation of County response personnel in their work to manage this type of incident.

Issues regarding security and access to private property could also be an operational concern, especially for federal, state and local sampling and monitoring teams responding to an impacted area within Jasper County.

Jasper County will make every reasonable effort to respond in the event of an ingestion pathway incident. However, County resources and systems may be not entirely adequate to conduct the necessary sampling, monitoring and decontamination operations required. Should this be the case, the County EMA will make the appropriate requests and confer with the County Commissioners to make the necessary declarations necessary to bring in those specific resources required to perform ingestion pathway response activities.

The responsibilities and principles outlined in this plan will be fulfilled only if the situation, information exchange, extent of actual agency capabilities, and resources are available at the time.

There is no guarantee implied by this plan that a perfect response to an emergency or disaster of this type will be practical or possible.

This Plan shall be updated every 18 to 24 months, depending upon the needs of the County. It will also be evaluated and exercised as a part of the State's requirement for an Ingestion Pathway exercise to be conducted every six years by FEMA, DOE, and the NRC.

Authorities, Policies, and Guidance Documents

In order to ensure compliance with Federal, State, and Local authorities and policies, the following documents were used in the development of this document:

A. Federal

1. "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants." NUREG-0654/FEMA-REP-1, Rev. 1, November 1980

2. "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants." NUREG-0654/FEMA-REP-1, Rev. 1, Supp. 1, September 1988.

3. "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants." NUREG-0654/FEMA-REP-1, Rev. 1, Supp. 2, April 1996.

4. "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants." NUREG-0654/FEMA-REP-1, Rev. 1, Supp. 3, July 1996.

5. "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents", EPA-400-R-02-001, May, 1992, U.S. Environmental Protection Agency.

6. "Accidental Radioactive Contamination of Human Food and Animal Feeds; Recommendations for State and Local Agencies." U.S. Department of Health and Human Services, Food and Drug Administration, 63FR43402, of August 13, 1998.

7. "Guidance-Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies," U.S. Department of Health and Human Services, Food and Drug Administration, 66FR238:64046, of December 11, 2001.

8. "Guidance on Offsite Emergency Radiation Measurement Systems, Phase 2 – The Milk Pathway," FEMA REP-12/September 1987.

9. "Guidance on Offsite Emergency Radiation Measurement Systems, Phase 3 – Water and Non-Dairy Food Pathway," FEMA REP-13/May 1990.

10. "Radiological Emergency Preparedness Exercise Evaluation Methodology,"FEMA-REP-15, September 1991.

11. “Interim Radiological Emergency Preparedness Program Manual,” Federal Emergency Management Agency, August 2002.

12. 44 CFR 350: Review and Approval of State and Local Radiological Emergency Plans and Preparedness, Code of Federal Regulations, Title 44.

13. 44 CFR 351: Radiological Emergency Planning and Preparedness, Code of Federal Regulations, Title 44.

14. 44 CFR 352: Commercial Nuclear Power Plants: Emergency Preparedness Planning, Code of Federal Regulations, Title 44.

B. State

1. Indiana Code 10-14-3, Emergency Management and Disaster Law

2. Indiana Executive Order 05-09: Establishing and clarifying the duties of state agencies for all matters relating to emergency management

3. A Leader’s Guide to Emergencies and Disasters, Indiana Department of Homeland Security (September 2008)

C. Local

1. Jasper County Emergency Management Ordinance

2. Jasper County Comprehensive Emergency Management Plan

CONCEPT OF OPERATIONS

Operational Overview

The Jasper County Board of Commissioners is ultimately responsible for protecting lives and property in an emergency or disaster. The Commission has granted the authority to act and make life saving decisions to the various public safety organizations within the county. They have further identified the County Emergency Management Director as the primary coordinator of these organizations in times of disaster. The Jasper County Ingestion Pathway Plan is a portion of the overall Jasper County Comprehensive Emergency Management Plan (CEMP) and will be activated where there is a real or anticipated need.

A. County CEMP

1. Each agency is responsible for taking actions to identify their capabilities and resources to effectively respond to an ingestion pathway incident;

2. The County utilizes the Emergency Support Function (ESF) concept, which groups specific agencies and departments into larger contingents for achieving coordinated response and recovery operations. Each ESF has a designated Primary Coordinating Agency responsible for communicating with supporting departments to secure resources and pass on critical incident information. The following ESFs are found in the Jasper County CEMP:

State of Indiana Emergency Support Functions	
ESF 1 – Transportation	ESF 9 – Search and Rescue
ESF 2 – Communications	ESF 10 - Hazardous Materials
ESF 3 – Public Works	ESF 11 - Agriculture
ESF 4 – Fire	ESF 12 – Energy
ESF 5 – Emergency Management	ESF 13 – Law Enforcement
ESF 6 – Mass Care	ESF 14 – Long-Term Recovery
ESF 7 – Resource Support	ESF 15 – External Affairs
ESF 8 – Health	

3. Within each ESF found in this document and those identified in the Jasper County Emergency Management Plan, there will be a number of tasks that are to be completed to ensure stabilization and appropriate response to an ingestion pathway incident. For the purposes of this document, County public safety agencies will focus their activities on the Response and Recovery Phases associated with such an event.

4. Key Response Action Checklists are found in this document beginning is Section 1 of this Plan.

B. Emergency Classification Levels

Jasper County, for the purposes of this Ingestion Pathway Plan, recognizes the Emergency Classification Levels established by the nuclear facilities where containment issues may occur (licensee). The initial accident assessment would be made by licensee and the emergency response organization of the state in which facility is located. The situation would be classified according to one of the following four categories:

Emergency Classification Levels	
Level	**Description of Activities for Each Level**
Unusual Event	Under this category, events are in process or have occurred which indicate *potential degradation in the level of safety of the plant.* Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs. This is the least severe of the four (4) levels. The purpose of this classification is to bring response personnel and offsite agencies to a state of readiness in the event the situation degrades and to provide systematic handling of information and decision making.
Alert	Events are in process or have occurred which indicate an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are expected to be limited to small fractions of EPA Protective Action Guideline exposure levels. The purpose of this classification is to ensure that emergency response personnel are readily available and to provide offsite authorities with current status information. An Alert will be classified as the initiating event or as escalation from an Unusual Event. In either case, the classification will most likely made by the Shift Manager (Shift Emergency Director) prior to the transfer of Command and Control.

Emergency Classification Levels (Continued)	
Level	**Description of Activities for Each Level**
Site Area Emergency	Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile action that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of, or 2) that prevent effective access to equipment needed for the protection of the public. Any beyond the site boundary releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels. The purpose of this classification, in addition to those of the Alert level, is to ensure that all emergency response centers are staffed and provisions are made for information updates to the public through offsite authorities and the news media. The classification will most likely be made by the Station Emergency Director
General Emergency	Event(s) are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area. The purpose of this classification, in addition to those of the Site Area Emergency level, is to initiate predetermined protective actions for the public and provide continuous assessment of information from monitoring groups. The classification will most likely be made by the Station Emergency Director.

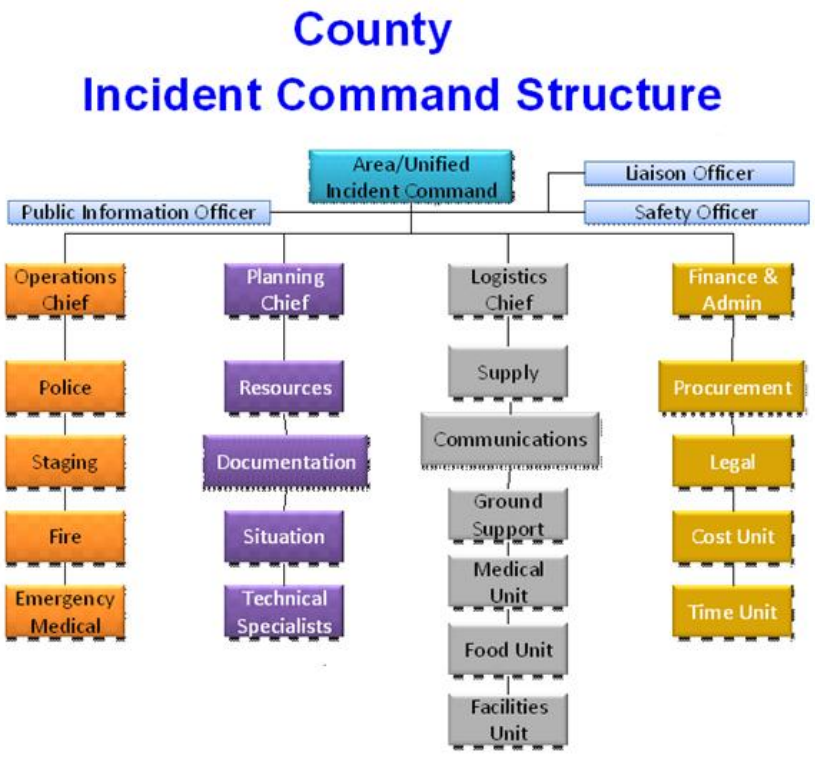
C. Organization and Responsibilities

During any emergency situation within Jasper County, the Incident Command System will be used. The system that has been established in the County is based upon the standard Incident Management structure and requirements outlined by the National Incident Management System (NIMS).

The Jasper County Incident Command system sets the basic standard for response, in that, its modular structure allows for consistent use of personnel, information, and methods for planning from one incident to another. However, since no single incident is exactly the same, Incident Command can be scaled up or down, to meet the demands of the situation. This modular structure and approach allows for the County and its response agencies to maximize their resources and in turn, minimize the time it takes for those resources to begin the overall task of response.

In keeping with the requirements of NIMS, the Country Incident Command structure has also been developed to fully integrate into other ICS structures from other counties, other State agencies, or Federal level support agencies. Having this functionality ensures that key personnel, equipment, and critical information can be shared rapidly and effectively from one level of government to the next.

Below is a depiction of the basic model that will be used in Jasper County:



ICS is connected to the County CEMP through the usage and application of the various ESFs identified previously, coordinated through the Operations Section of the County ICS structure. As such, each ESF has designated both Primary and Support Agencies from the various county agencies that have similar functions, training, resources and capabilities. This information will be explained in greater detail starting in Section 1 of this document.

D. County Agencies – General Responsibilities

The following list of activities has been developed as a general guideline for those County agencies that have been tasked with primary or support roles in the Jasper County CEMP. This list is not an all inclusive list as more detailed tasks will be found in the fifteen sections that follow, which outline the specific response priorities for each county ESF during or following an Ingestion Pathway Incident.

1. General Response Tasks

   a Alert, warn and notify the general public and public safety personnel of a radiological release, if such event has occurred based upon the Emergency Classification Levels.

   b Identify areas and locations within the County that have been have been or may be potentially impacted by ingestion pathway incident.

   c Activate, establish, and/or support Incident Command, the County Emergency Operations Center, or a Forward Operations Center and staff accordingly.

   d Provide life safety and protective action measures within the county.

   e Activate primary communications capabilities to ensure appropriate notification and accountability of staff is maintained throughout the incident.

   f Identify and report any disruptions in essential services especially community water utilities and potential impact to crops and other food sources for both people and animals.

   g Identify potential impacts to County critical facilities such as governmental facilities, hospitals, roadways, other essential services/utilities.

   h Report any resource or personnel gaps and shortfalls.

   i Directly support federal and state monitoring and sampling teams as response and recovery operations take place.

   j Continue to monitor and report additional risks or hazards that may impede overall response operations within the County.

E. ESF Response Priorities

1. ESF-1 Transportation

    a. Provide equipment, operators, and subject matter expertise to assist in the response to an ingestion pathway incident.

    b. Assist in the movement of personnel, equipment, materials, and supplies to effectively manage or address operational needs.

    c. Clear or cordon off roadways as needed or required for the movement of responders and for the evacuation of the public.

    d. Prioritize critical roadways and ensure roads are opened or closed depending upon operational needs.

2. ESF-2 Communications

    a. Ensure primary communications systems are operational.

    b. Identify or establish back-up and redundant systems for emergency communications if primary facilities are impacted by a radiological incident.

    c. Ensure that essential county personnel and those responders who will serve as a part of the sampling or monitoring teams have functioning communications equipment.

    d. Ensure the delivery and receipt of critical messages and information pertaining to the ingestion pathway incident among all stakeholders – federal, state, and local.

3. ESF-3 Public Works and Engineering

    a. Ensure measures are in place for the continual evaluation of water utilities and/or primary water sources for those jurisdictions with the ingestion pathway area.

    b. Identify areas, facilities, or systems that would be substantially impacted by an ingestion pathway incident and work to develop the necessary policies, plans and procedures to mitigate that impact, where possible.

    c. Maintain equipment and identify personnel with the subject matter expertise to assist in the response to an ingestion pathway incident.

    d. Identify and prioritize potential issues and/or existing gaps in the current capability to respond to an ingestion pathway incident.

4. ESF-4 Fire Fighting

    a. Provide the necessary equipment and trained subject matter experts to assist in the a response to an ingestion pathway incident.

    b. Identify and prioritize potential issues and/or existing gaps in the current capability to respond to an ingestion pathway incident.

    c. Promote and assist in the usage and application of incident command concept to those jurisdictions within the ingestion pathway areas.

    d. Develop and implement protocols for the movement of personnel, equipment, materials, and supplies to effectively address or manage an ingestion pathway incident.

5. ESF-5 Emergency Management

    a. Serve as the central coordination element for an ingestion pathway incident within the County by maintaining communications with essential stakeholders and providing information to promote a common operating picture.

    b. Provide information to county senior officials on the nature, magnitude, and potential impacts of the ingestion pathway incident.

    c. Notify the necessary agencies and personnel required to staff and support EOC operations and field activities during an ingestion pathway incident and provide logistical and technical support, as required.

    d. Identify and prioritize potential issues or gaps in the current capability to respond to an ingestion pathway incident and work to resolve these issues/gaps.

6. ESF-6 Shelter and Mass Care

    a. Pre-identify potential shelter sites and locations that support the need for evacuation and relocation of citizens that reside in the ingestion pathway area.

    b. Identify and train staff for shelter and mass care operations.

    c. Provide maps, locations, and descriptions of pre-identified facilities to required personnel and ensure the appropriate equipment, supplies, and materials are available for rapid activation.

7. ESF-7 Resource Support

    a. Develop and maintain a detailed list of the required equipment, supplies and materials necessary for an effective response to an ingestion pathway incident.

    b. Identify and prioritize potential issues or gaps in the current capability to respond to an ingestion pathway incident and work to find alternate means to resolve problem areas.

    c. Work with other state and federal agencies to coordinate the staging and deployment of equipment and supplies to an impacted area.

    d. Ensure that agencies and departments deploying assets to the impacted areas maintain and track the hours and other associated costs with the deployment of those resources.

8. ESF-8 Health and Medical

    a. Make recommendations to those agencies and departments deploying personnel to the affected areas on the appropriate and necessary protective actions to be taken.

    b. Support the activation and management of activities of the field sampling teams to ensure effective monitoring and response operations are taken within the impacted areas.

    c. Coordinate the dissemination of information regarding the extent of contamination on county food and water supplies and ensure appropriate protective actions area taken by the public.

9. ESF-9 Search and Rescue

    a. Identify SAR resources that exist within the ingestion pathway area and ensure that they that are in a position to respond or be utilized as required or needed.

    b. Ensure communication is established between the SAR resources/personnel and the County EOC.

    c. Identify and prioritize potential issues and gaps in the capability to respond to an ingestion pathway incident and work to find alternate means to resolve problem areas.

10. ESF 10 Hazardous Materials

    a. Make recommendation to those agencies and departments deploying personnel into the impacted area on the appropriate level of personnel protection equipment and applicable protective actions.

    b. Ensure communication is established between the SAR resources/personnel and the County EOC.

    c. Identify and prioritize potential issues and gaps in the capability to respond to an ingestion pathway incident and work to find alternate means to resolve problem areas..

11. ESF-11 Animal Health and Natural Resources

    a. Identify farming, livestock, poultry and swine production facilities that exist in the ingestion pathway area and ensure this information is shared with those personnel who may conduct operations in the Ingestion Pathway Zone.

    b. Work with federal and state personnel to identify potential environmental and agricultural impacts from the ingestion pathway incident.

    c. Directly support and assist in the activities of the field sampling teams to ensure effective monitoring and response operations are taken within the impacted areas, specifically focusing on crops, produce and animal production.

    d. Identify and prioritize potential issues or gaps in the current capability to respond to an ingestion pathway incident and work to find alternate means to resolve problem areas.

12. ESF-12 Energy

    a. Identify the potential impacts regarding the delivery and transmission of electrical power to the county should an emergency situation occur.

    b. Pre-identify locations where fuel is stored within the ingestion pathway area as well as generators and energy sources and ensure this information is shared with those personnel who may conduct operations in the Ingestion Pathway Zone.

    c. Identify potential alternate or backup energy resources to be activated as needed or required.

    d. Identify and prioritize potential issues or gaps in the current capability to respond to an Ingestion Pathway event and work to find alternate means to resolve problem areas.

13. ESF-13 Law Enforcement

    a. Serve as the central coordination point for all law enforcement operations conducted within the county during an ingestion pathway incident performing such essential tasks as making arrests, traffic control, support of transportation and evacuation, and other critical security tasks and activities.

    b. Provide back-up communications capability for first responders operating within an impacted area, if applicable and/or available.

    c. Support other agencies and departments in the alert, warning and notification of those communities within the impacted area.

14. ESF-14 Long-Term Recovery

    a. Identify potential environmental, societal and economic impacts that may be felt in those communities in the Ingestion Pathway Zone.

    b. Should an Ingestion Pathway Event occur, work with the appropriate federal, state agencies to provide restitution for damages, appropriate medical and the necessary remediation of the impacted area.

    c. Provide for the necessary temporary long-term housing and economic needs for residents of communities who may require such services.

    d. Work with and coordinate the removal and disposal of contaminated goods and products to lessen or eliminate the impact of radiological contamination.

15. ESF-15 Public Information

    a. Seek out subject matter experts on the impact and issues surrounding Ingestion Pathway incident to develop messages and information to disseminate to the communities that are within the potentially impacted areas.

    b. Coordinate with public information personnel from various response agencies from federal, state, local and private organizations to form, as required, a Joint Information Center to collect, process, and disseminate information.

    c. Implement the required information releases that direct life safety issues such as alerts for food and water consumption as well as the potential for contamination to farm animals and crops.

    d. Identify and prioritize potential issues or gaps in the current capability to collect, process, and disseminate information on ingestion pathway incident and work to find alternate means to resolve problem areas.

F. Multi-Agency Coordination (MACS)

1. General

   A MACS is a combination of facilities, equipment, personnel, procedures, and communications integrated into a common system with responsibility for coordinating and supporting incident management activities.

   The primary functions of MACS include, but are not limited to:

   a. Support incident management policies and priorities

   b. Facilitate logistics support and resource tracking

   c. Inform resource allocation decisions using incident management priorities

   d. Coordinate incident related information

   e. Coordinate interagency and intergovernmental issues regarding incident management policies, priorities, and strategies

2. Components of MACS

   With regard to the coordination of an Ingestion Pathway or radiological incident, the primary components of the MACS for Indiana shall include:

   a. State Emergency Operations Center (State EOC)

      The State EOC is the primary location for centralized coordination to take place during all major incidents impacting citizens and communities within Indiana. During radiological incidents, the State EOC will serves the key facility linking state and federal agencies together to meet resource and logistical needs as well as facilitate operational decisions that will ensure the successful outcome of a multi-agency response.

   b. Forward Operations Center (FOC)

      The FOC is a primary location in the field activated in response to an Ingestion Pathway or other radiological incident or emergency. Unlike the State EOC, the FOC is used as a resource to centralize and coordinate overall field sampling and monitoring activities, but may also serve as a place where other local, state, and federal entities co-locate to monitor and evaluate on-scene radiological functions.

Activation of the FOC will depend on the location of the incident:

1) For the nuclear facilities in Michigan (Palisades and D.C. Cook), an FOC will be established at the ISP Post in Bremen, IN, District 24 or at another location that can support an FOC.

2) For the nuclear facilities in Illinois (Braidwood and Dresden), an FOC will be established the ISP Post in Lowell, District 13 or an appropriate location that can support an FOC.

c. County Emergency Operations Center (County EOC)

While the State EOC is the primary location for the coordination of state-level assets and information, the County EOC is the primary location for management and coordination of resources, personnel and information within an impacted county. It is a central location where senior leaders as well as primary and support agencies can monitor events and provide information so the best decisions and courses of action can be made.

d. Equipment and Supplies

Equipment and supplies will be made available through the appropriate channels for requesting supplies and materials. However, due to the nature of an Ingestion Pathway incident, field sampling and radiological detection equipment are available through the Radiological Health Section of the Indiana State Department of Health and the Radiological Emergency Preparedness Coordinator from the Indiana Department of Homeland Security.

PROTECTIVE ACTIONS

Decision-Making and Health Priorities

Protective action decision-making will be made in accordance with federal guidance as delineated in FEMA, EPA and FDA documents, and consideration of the health, economic and social impacts of the proposed actions. There are two levels of protective actions: 1) *Preventative Protective Actions* – or – those actions taken to prevent or minimize contamination of water, milk, and food products; and 2) *Emergency Protective Actions* – or – those actions taken to isolate or contain potentially contaminated food from entering the marketplace.

Representatives from the Indiana State Department of Health, in conjunction with key federal, state, and local stakeholders, will formulate the appropriate protective actions based upon input from the affected state, samples taken with the ingestion pathway emergency zone and the appropriate FEMA guidance and REP publications.

A. Preventative Protective Actions

Preventative Protection Actions will be considered for implementation if the measured concentrations of radio-nuclides exceed the response levels recommended in the FDA guidance.

1. Pasture – Remove lactating animals from contaminated pasture, substitute uncontaminated stored feed, and substitute source of uncontaminated water.

2. Milk – Withhold contaminated milk from the market to allow decay of short-lived radio-nuclides. This may be achieved by storing frozen fresh milk, frozen concentrated milk, or frozen concentrated milk products. Storage for prolonged times at reduced temperatures is also feasible provided ultra high-temperature pasteurization techniques are employed for processing.

3. Drinking Water – Avoid using surface water (streams, lakes, ponds) for human and animal consumption. Prohibit filling reservoirs by pumping water from flowing streams. Water supplies receiving major portion of their water from the surrounding watershed will be the focus of protective actions. Potentially contaminated soil and run-off may concentrate radioactive materials in the water supply. Public surface water supplies may be quarantined until testing for radioactivity levels confirm or refute the need for control.

4. Fruits and Vegetables – Wash, brush, scrub, or peel to remove the surface contamination. Preserve by canning, freezing, and dehydration or storage to permit radioactive decay of short-lived radio-nuclides.

5. Grains -- Processing operations such as milling, and polishing.

6. Other Food Products -- Processing to remove surface contamination.

7. Meat and Meat Products -- intake of cesium-134 and cesium-137 by an adult via the meat pathway may exceed that of the milk pathway; therefore, levels of cesium in milk which approach the "response level" should cause surveillance and protective actions for meat as appropriate.

8. Animal Feeds Other Than Pasture -- Action should be taken on a case-by-case basis considering the relationship between the radio-nuclide concentration in the animal feed and the concentration of the radionuclide in human food.

9. Fish and Wildlife -- Suspend operations of commercial fishing, charter fishing boats, recreational fishing and restrict hunting, as appropriate.

B. Emergency Protective Actions

Emergency Protective Actions will be considered for implementation if measured concentrations of radio-nuclides exceed the response levels recommended in the FDA guidance. Emergency protective action may require condemnation or destruction of milk and food products in order to prevent its introduction into commerce. Before taking this action, the factors listed below should be considered:

1. The availability of alternative protective actions

2. The relative proportion of the total diet, by weight, represented by the item in question

3. The importance of the particular food in nutrition and the availability of uncontaminated food or substitutes having the same nutritional properties.

4. The relative contribution of other food and other radio-nuclides to the total projected dose

5. The time and resources required to implement corrective action

C. Safe Recovery

1. Once radiological contamination levels are below recommended emergency protective action guidelines (PAG) as defined by the United State Environmental Protection Agency (EPA) for radiological exposure, removing restrictions on harvesting, processing, and consumption of food and water will be considered on a case-by-case basis. Removal of restrictions will be directed by federal and state partners, with support of the impacted jurisdiction being directed through the County EOC.

2. Following the initiation of recovery operations, the County will support federal and state agencies to determine the necessary actions and requirements for bring the affected area(s) back to normal levels of operation. Items that County public safety personnel may be tasked with include:

    a. Coordinating area radiological surveys and evaluating data.

    b. Mobilizing necessary resources, manpower, and equipment.

    c. Determining communication needs.

    d. Determining the need for Federal assistance.

    e. Coordinating with other states.

3. Positions activated during emergency response will initially remain active during the recovery phase. As the recovery phase progresses, the IDHS Response Director or the EOC Manager will allow selected positions of the state emergency response organization to return to their non-emergency modes of operation.

4. Both the Mitigation and the Recovery Sections of IDHS working with ISDH and other primary agencies may collaborate on implementing long-term recovery strategies in order to reach the non-occupational whole-body exposure limits for the public in the impacted areas.

5. Restrictions on food and water may be lifted when ISDH has determined that levels of radioactive material found in food and water supplies have decreased below the PAGs established by the FDA.

PUBLIC INFORMATION

State and Local Coordination

If an Ingestion Pathway incident occurs, a Joint Information Center (JIC) may be established in the state where the nuclear power facility is located. In turn, the IDHS Public Information Officer (PIO) may also be called to open and activate a JIC to address media issues and concerns for the impacted counties within the State of Indiana, and will liaise with the state where the incident has occurred. Local actions taken to support the public information function include:

A. Establishing and Using a Situation Hotline

A designated telephone number will be made available to the County to direct the public to obtain information and address concerns regarding the Ingestion Pathway response. This hotline will provide general information and any applicable emergency instructions.

B. Brochures

Printed information on the effects of radiation and methods of preventing radiological contamination of food products will be available for distribution to farmers and food processing facilities within the Ingestion Pathway EPZ.

C. Media Releases

Media releases will be formulated in the State EOC and where applicable and required, in the County EOC. These messages will be coordinated between state and local public information officers to ensure information is consistent throughout the impacted area(s) and to accurately capture incident information from the emergency response organization of the state in which the accident occurs. Once the messages are prepared, they will be reviewed by essential stakeholders before release.

RESPONSE COORDINATION

Federal, State, and Local Stakeholders

A. Federal Response Agencies

The federal government, in the event of a radiological accident will activate the Federal Radiological Emergency Response Plan (FRERP). The FRERP identifies the authorities and responsibilities of each federal agency that may have significant role in the emergency response.

The federal agencies have agreed to coordinate their effort through the FRERP; assuring the states and local jurisdictions that federal technical assistance is fully supporting their effort to protect the public. Included in the FRERP, the Federal Radiological Monitoring and Assessment Center (FRMAC) is the operational framework for coordinating the radiological monitoring and assessment activities of the federal agencies.

The FRMAC is initially managed by the US Department of Energy (DOE). The federal agencies participating in the FRMAC include the Nuclear Regulatory Commission (NRC), The Environmental Protection Agency (EPA), the Department of Health and Human Services (HHS), the Department of Energy (DOE), the US Department of Agriculture (USDA), the Department of Defense (DoD) and the Department of Commerce.

In addition to these agencies, the Federal Emergency Management Agency (FEMA) is also an integral partner in a radiological response, as it coordinates the overall federal off-site support to impacted states. In addition, FEMA serves the primary point of contact for federal assistance requests and supports public information and outreach on non-technical issues.

B. State Response Agencies

The State of Indiana, in the event of an Ingestion Pathway Incident, will activate the Indiana Ingestion Pathway Plan (IPP). The IPP identifies the authorities and responsibilities of each state agency that may perform critical roles in the emergency response to such an incident. Much of these activities will be in the identification, tracking, sampling, and monitoring of the situation as it unfolds in impacted areas within Indiana.

Selected state agencies have agreed to coordinate their effort through the IPP, providing local jurisdictions with technical assistance to support and protect the public. Included in the IPP, is the operational framework for radiological detection and evaluation as well as an established resource management and logistics process.

The IPP is jointly coordinated by the Indiana State Department of Health (ISDH) and the Indiana Department of Homeland Security (IDHS). The state agencies participating in the IPP include but are not limited to the Indiana Department of Environmental Management (IDEM), Indiana Department of Natural Resources (DNR), the Indiana Board of Animal Health (BOAH), the Indiana State Department of Agriculture (ISDA), the Office of the Indiana State Chemist (OISC), the Indiana Office of the Governor, and the Indiana State Police (ISP).

C. Jasper County Response Agencies

Should there be an Ingestion Pathway incident impacting Jasper County, the County Ingestion Pathway Plan (IPP) will be activated. The County IPP identifies the authorities and responsibilities of each local agency that may take response and support roles in conjunction with federal and state personnel performing activities as identifying, tracking, sampling, and monitoring the situation as it unfolds in impacted areas within Indiana.

Selected County agencies identified in the County IPP may be called upon to support and protect the public. As such, the County IPP shall act as the operational framework for radiological detection and evaluation.

The IPP shall be coordinated by the Jasper County Emergency Management Agency, in conjunction with IDHS and ISDH. The local departments with identified roles in the County include but are not limited to the Jasper County Emergency Management Agency (County EMA), Jasper County Health Department, the Jasper County Cooperative Extension Office, Jasper County Board of Commissioners, the Jasper County Sheriff's Department, and the Rensselaer, Demotte, Wheatfield, and Remington Police Department(s).

STANDARD OPERATING GUIDELINES

Notification of Local Jurisdictions

A. Purpose

This procedure describes process and required information for the notification of all responsible personnel to a Nuclear Power Plant Accident/Incident which could affect the citizens and communities of Jasper County.

B. Scope

The procedure shall apply to the following Emergency Classification Levels:

1. An Alert – Events are in process or have occurred which indicate an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of EPA Protective Action Guideline exposure levels.

2. A Site Area Emergency – Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of, or 2) that prevent effective access to equipment needed for the protection of the public. Any releases beyond the site boundary are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels.

3. A General Emergency – Event(s) are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

C. Background

The procedure has been developed for those potential radiological incident occurring at the Braidwood, Illinois facility which poses an ingestion pathway risk to Jasper County.

These procedures were established to ensure the appropriate alert and notification of essential County personnel to begin response and support activities.

D. Local Notification Procedures

The IDHS Watch Desk notifies IDHS Homeland Security District Coordinators, County EMA offices, and/or County Warning Points of affected counties and relays the type of emergency i.e. Alert/Site Area Emergency or General Emergency Status. They are to call the 24 hour number for the State EOC and coordinate their activation level in WebEOC.

Contact with local jurisdictions will be made using the following call-down roster:

1. For incidents involving Braidwood Station:
    a. IDHS Homeland Security District Coordinator for District # 1
    b. Jasper County EMA & Jasper County Sheriffs Department
    c. Lake County EMA & Lake County Sheriffs Department
    d. Newton County EMA & Newton County Sheriffs Department
2. For incidents involving Dresden Station:
    a. IDHS Homeland Security District Coordinator for District # 1
    b. Lake County EMA & Lake County Sheriffs Department
    c. Newton County EMA & Newton County Sheriffs Department
3. For incidents involving the D.C. Cook facility:
    a. IDHS Homeland Security District Coordinators for Districts 1, 2 and 3
    b. Elkhart County EMA & Elkhart County Sheriffs Department
    c. Kosciusko County EMA & Kosciusko County Sheriffs Department
    d. LaGrange County EMA & LaGrange County Sheriffs Department
    e. Lake County EMA & Lake County Sheriffs Department
    f. LaPorte County EMA & LaPorte County Sheriffs Department
    g. Marshall County EMA & Marshall County Sheriffs Department
    h. Porter County EMA & Porter County Sheriffs Department
    i. St. Joseph County EMA & St. Joseph County Sheriff’s Department

j. Starke County EMA & Starke County Sheriffs Department

k. Goshen City Police Department

l. Michigan City Police Department

4. For incidents involving the Palisades facility:

   a. IDHS Homeland Security District Coordinators for Districts 1 and 2

   b. Elkhart County EMA & Elkhart County Sheriffs Department

   c. LaPorte County EMA & LaPorte County Sheriffs Department

   d. St. Joseph County EMA & St. Joseph County Sheriffs Department

   e. Michigan City Police Department

5. Once contact has been made with Jasper County, the EMA office in conjunction with the County Sheriff will make the necessary contacts with agencies and departments to include but not limited to the Jasper County Health Department, the Jasper County Cooperative Extension Office, Jasper County Board of Commissioners, and the Rensselaer, Demotte, Wheatfield, and Remington Police Department(s).

6. County personnel will be given specific instructions as to where they should go to receive their mission assignments and taskings, while the County EMA office will coordinate with IDHS on the activation and location of the Forward Operating Center in impacted area.

STANDARD OPERATING GUIDELINES

Emergency Support Functions – Response Tasks

A. Purpose

These guidelines describe basic response tasks associated within each of the fifteen (15) Emergency Support Functions (ESFs) established as an integral part of the comprehensive planning mechanism for the Jasper County. The tasks that follow are directly related to the activities required by the County and its response personnel to manage and coordinate federal and state support for a Nuclear Power Plant Accident/Incident which could affect the citizens and communities of Jasper County.

B. Scope

The procedure shall apply to the following Emergency Classification Levels:

1. An Alert – Events are in process or have occurred which indicate an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are expected to be limited to small fractions of EPA Protective Action Guideline exposure levels.

2. A Site Area Emergency – Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile action that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of, or 2) that prevent effective access to equipment needed for the protection of the public. Any releases beyond the site boundary are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels.

3. A General Emergency – Event(s) are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

C. Background

These guidelines have been developed for those potential radiological incidents occurring at the Braidwood facility in Illinois, which poses an ingestion pathway risk to Jasper County.

These guidelines were established to ensure the appropriate coordination and management of essential County personnel in response and support activities.

D. ESF Response Tasks

Response Tasks – ESF 1 Transportation			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings.	
	2	If a representative is called to support local EOC or FOC activities, provide information on local transportation facilities, assets, personnel and equipment that may be potentially impacted by the specific incident and begin developing contingencies for activating back-up resources	
	3	Determine major roadways and critical infrastructure that may require closure and the potential for detours	
	4	Make the necessary considerations for responders and field sampling and monitoring teams to have access in and around the impacted area	
	5	Work with other local, state, and federal agencies in the movement of potentially contaminated materials, food stuffs or animals within the impacted area	
	6	Support, as required, missions requiring the movement of personnel and equipment into and out of the impacted area, utilizing appropriate decontamination procedures to lessen the impacts of potential exposure to radiological materials	
	7	Support other critical transportation missions and tasks, as need or required that relate to a Ingestion Pathway response	

Response Tasks – ESF 2 Communications			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings	
	2	If a representative is called to support local EOC or FOC activities, provide information on local communications facilities, assets, personnel and equipment that may be potentially impacted by the specific incident and begin developing contingencies for activating back-up resources	
	3	Work with ESF 1 to identify routes of ingress and egress to and from the impacted are that may hinder the ability to maintain routine and emergency communications	
	4	Provide as needed, supplemental emergency communications equipment such as portable radios, mobile phones, etc. to support Ingestion Pathway response activities	
	5	Work with other local, state, and federal agencies to ensure interoperability is achieved and maintained with agencies and departments in the State EOC and FOC	
	6	Support other critical transportation missions and tasks, as need or required that relate to a Ingestion Pathway response	

Response Tasks – ESF 3 Public Works and Engineering			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings	
	2	If a representative is called to support local EOC or FOC activities, determine the facilities, assets, personnel and equipment potentially impacted by the specific incident and begin developing contingencies for activating back-up resources, especially those pertaining to water supplies and water treatment	
	3	Work with ESF 1 to identify routes of ingress and egress to and from the impacted are that may hinder the ability to test and evaluate water supplies and treatment facilities	
	4	Make the necessary considerations for responders and field sampling and monitoring teams to have access in and around the impacted area	
	5	Support field sampling and monitoring teams by providing information on the facilities in the impacted area as well as those residents who may require alternate water supplies dues to the potential for contamination	
	6	Support, as required, missions requiring the movement of personnel and equipment into and out of the impacted area, utilizing appropriate decontamination procedures to lessen the impacts of potential exposure to radiation	
	7	Support other critical public works and engineering missions and tasks, as need or required that relate to an Ingestion Pathway response	

Response Tasks – ESF 4 Public Works and Engineering			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings	
	2	If a representative is called to support local EOC or FOC activities, determine the facilities, assets, personnel and equipment potentially impacted by the specific incident and begin developing contingencies for activating back-up resources	
	3	Determine major roadways and critical infrastructure that may require closure and the potential for detours and evacuations	
	4	Make the necessary considerations for responders and field sampling and monitoring teams to have access in and around the impacted area	
	5	Work with other local, state, and federal agencies to provide personnel to be a part of Incident Management Teams, Field Sampling Teams, or Decontamination Teams, as required	
	6	Support, as required, other missions requiring the movement of personnel and equipment into and out of the impacted area, utilizing appropriate decontamination procedures to lessen the impacts of potential exposure to radiation	

Response Tasks – ESF 5 Emergency Management			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings	
	2	Determine the facilities, assets, personnel and equipment potentially impacted by the specific incident and begin developing contingencies for activating back-up resources	
	3	Determine major roadways and critical infrastructure that may require closure and the potential for detours and evacuations. Coordinate evacuation and shelter operations with ESFs 1 and 6	
	4	Request State and Federal assistance to support Ingestion Pathway response	
	5	Provide reporting to the County Commissioners and other key elected and appointed officials on the potential impacts to the public at-large	
	6	Maintain continual contact with essential county agencies and departments to ensure an accurate and timely Common Operating Picture is maintained	
	7	Support other critical public works and engineering missions and tasks, as need or required that relate to a Ingestion Pathway response	

Response Tasks – ESF 6 Mass Care			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings	
	2	Determine the facilities, assets, personnel and equipment potentially impacted by the specific incident and begin developing contingencies for activating back-up resources	
	3	Determine major roadways and critical infrastructure that may require closure and the potential for detours and evacuations.	
	4	Support the movement of volunteer personnel and donated supplies for residents impacted by the Ingestion Pathway event.	
	5	Identify current mass care resources to determine gaps and shortfalls and secure alternate sources to fill those gaps.	
	6	Activate primary shelters, and if primary locations are not available, utilize secondary or implement mutual aid plans for shelter operations in other jurisdictions. Shelters established should consider functional and medical needs populations.	
	7	Provide information to response partners on current capabilities and other issues regarding mass care support to an Ingestion Pathway event.	
	8	Support other critical mass care missions and tasks, as need or required that relate to a Ingestion Pathway response	

Response Tasks – ESF 7 Resource Support			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings	
	2	Work with all essential County agencies and departments to determine those facilities, assets, personnel and equipment that may be impacted by the specific incident and begin activating back-up resources through mutual aid or requests to the State EOC through WebEOC.	
	3	Obtain information on roads closed and work with ESF-1 to determine alternate routes for delivery and distribution of resources and materials.	
	4	Ensure compliance with all applicable procurement and spending policies needed to secure requested equipment, supplies and materials.	
	5	Provide information to response partners that will assist them in the ongoing tracking, distribution and maintenance of specific equipment, materials and supplies necessary to support an Ingestion Pathway incident	
	6	Perform other critical resource support tasks as needed or required for Ingestion Pathway event operations	

Response Tasks – ESF 8 Health and Medical			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings	
	2	Determine the medical facilities, assets, personnel and equipment potentially impacted by the specific event and begin developing contingencies such as activating hospital diversion plans, emergency evacuation of facilities and established alternate care facilities to support care of patients.	
	3	Obtain information on roads closed and work with ESF-l to determine alternate routes for delivery and distribution of medical resources and materials.	
	4	Request State assistance as needed or required based upon the availability of resources and personnel to support patient movement, evacuation, diversion and other key medical operations.	
	5	Maintain communication with the appropriate local agencies and departments within the impacted area to ensure a viable and timely common operating picture is obtained.	
	6	Work with other local, state and federal agencies to activate and deploy Incident Management Teams, Field Sampling Teams, Field Monitoring Teams, or Decontamination Teams, as needed.	
	7	Work with ESF-15 (Public Information) to disseminate information regarding the nature and impact of the Ingestion Pathway incident on the health of citizens within the affected area and what can be done to lessen that impact.	
	8	Perform other critical medical tasks as needed or required to support Ingestion Pathway operations.	

Response Tasks – ESF 9 Search and Rescue			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings, should SAR activities be required.	
	2	Determine the facilities, assets, personnel and equipment potentially impacted by the specific event and take the necessary actions to move those assets away from or out of the impacted area.	
	3	Work with other local, state and federal agencies to determine if SAR resources are required and provide the necessary level of support to manage the missions and taskings.	
	4	Perform other critical medical tasks as needed or required to support Ingestion Pathway operations.	

Response Tasks – ESF 10 Hazardous Materials			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings	
	2	Determine the facilities, assets, personnel and equipment potentially impacted by the specific event and begin developing contingencies such as activating hazardous material response teams and other local capabilities.	
	3	Obtain information on roads closed and work with ESF-l to determine alternate routes for the movement of HAZMAT personnel and their equipment in response to a radiological incident.	
	4	Provide decontamination of equipment, personnel, and other resources as needed or required during the course of the Ingestion Pathway response.	
	5	Maintain communication with the appropriate local agencies and departments within the impacted area to ensure a viable and timely common operating picture is obtained.	
	6	Work with other local, state and federal agencies to activate and deploy Incident Management Teams, Field Sampling Teams, Field Monitoring Teams, or Decontamination Teams, as needed.	
	7	Work with ESF-15 (Public Information) to disseminate information regarding the nature and impact of the Ingestion Pathway incident on the health of citizens within the affected area and what can be done to lessen that impact.	

Response Tasks – ESF 11 Agriculture and Animal Health			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings	
	2	Determine facilities, assets, personnel and equipment potentially impacted by the specific event and begin developing contingencies for activating alternate resources	
	3	Obtain information on roads closed and work with ESF-l to determine alternate routes for animal health personnel to provide support and services to the impacted area	
	4	Request State assistance as needed or required based upon the availability of resources and personnel to support movement or the restriction moving crops, plants, animals and animal products into and out of the impacted area.	
	5	Maintain communication with the appropriate local agencies and departments within the impacted area to ensure a viable and timely common operating picture is obtained.	
	6	Work with other local, state and federal agencies to activate and deploy Incident Management Teams, Field Sampling Teams, Field Monitoring Teams, or Decontamination Teams, as needed.	
	7	Work with ESF-15 (Public Information) to disseminate information regarding the nature and impact of the Ingestion Pathway incident on crops, animal production, or other agricultural processes in the affected area and what can be done to lessen that impact.	
	8	Perform other critical tasks as needed or required to support Ingestion Pathway operations.	

Response Tasks – ESF 12 Energy			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings	
	2	Determine facilities, assets, personnel and equipment potentially impacted by the specific event and begin developing contingencies for activating alternate systems to provide continual energy services	
	3	Obtain information on roads closed and work with ESF-l to determine alternate routes for personnel servicing energy needs in the impacted area	
	4	Perform other critical tasks as needed or required to support Ingestion Pathway operations.	

Response Tasks – ESF 13 Agriculture and Animal Health			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings	
	2	Determine facilities, assets, personnel and equipment potentially impacted by the specific event and begin developing contingencies for activating alternate resources	
	3	Obtain information on roads closed and work with ESF-l to determine alternate routes for law enforcement personnel to provide support and services to the impacted area	
	4	Request State assistance as needed or required based upon the availability of resources and personnel to support movement or the restriction of movement of residents into and out of the impacted area.	
	5	Maintain communication with the appropriate federal, state, and local agencies and departments within the impacted area to ensure a viable and timely common operating picture is obtained.	
	6	Work with other local, state and federal agencies to activate and deploy Incident Management Teams, Field Sampling Teams, Field Monitoring Teams, or Decontamination Teams, as needed.	
	7	Perform other critical tasks as needed or required to support Ingestion Pathway operations.	

Response Tasks – ESF 14 Long Term Recovery			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings that will ensure the County achieves can bring impacted areas to a pre-incident state.	
	2	Determine facilities, assets, personnel and equipment potentially impacted by the specific event and conduct damage assessment / impact analysis noting costs incurred for lack of operation or use over the course of the Ingestion Pathway response.	
	3	Obtain information on roads closed and other critical infrastructure impacted by the incident for incorporation in potential disaster declarations	
	4	Work with other local, state, and federal agencies to deactivate and demobilize assets, paying close attention to damage, usage, and maintenance costs incurred.	
	5	Track and communicate the necessary guidelines and processes for tracking emergency procurement or purchases during the incident.	
	6	Perform other critical tasks as needed or required to support Ingestion Pathway operations.	

Response Tasks – ESF 15 Public Information			
Check	**Number**	**Task**	**Time Completed**
	1	Review the County Ingestion Pathway Plan and current procedures/guidelines to determine key priorities and potential missions and taskings that will provide timely and accurate information to the media and the public at-large.	
	2	Determine facilities, assets, personnel and equipment potentially impacted by the specific event and begin developing alternate methods for the delivery of information to the media and the public.	
	3	Obtain information on roads closed and other critical infrastructure impacted by the incident and communicate to the public what specific protective actions should be taken to lessen the impact on themselves and their property.	
	4	Establish and activate a Joint Information Center (JIC) to assist in the dissemination of information to the public regarding the Ingestion Pathway incident.	
	5	Work with local, state, and federal agencies to determine the appropriate information to release regarding the movement and disposal of potentially contaminated materials, food stuffs, crops, plant materials, and animals.	
	6	Perform other critical tasks as needed or required to support Ingestion Pathway operations.	

STANDARD OPERATING GUIDELINES

Field Sampling and Monitoring

A. Purpose

These guidelines were developed as a tool to assist State and Local personnel in the coordination of obtaining field samples in an area potentially impacted by and Ingestion Pathway incident as well as the task of monitoring an impacted for radiation immediately following such an incident.

B. Scope

The procedure shall apply to the following Emergency Classification Levels:

1. An Alert – Events are in process or have occurred which indicate an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are expected to be limited to small fractions of EPA Protective Action Guideline exposure levels.

2. A Site Area Emergency – Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile action that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of, or 2) that prevent effective access to equipment needed for the protection of the public. Any releases beyond the site boundary are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels.

3. A General Emergency – Event(s) are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

C. Background

These guidelines have been developed for those potential radiological incidents occurring at the Braidwood, Illinois facility, which poses an ingestion pathway risk to Jasper County.

These guidelines were established to ensure the appropriate coordination and management of essential County personnel in response and support activities.

D. Field Monitoring Teams

1. When it has been determined that Field Sampling Teams need to be activated and deployed to an impacted area, IDHS and ISDH will coordinate with County personnel who have been trained in radiological surveys and provide guidance on the rally location, time, and equipment needed for the Ingestion Pathway response.

2. When the team has arrived at the potentially impacted area to conduct monitoring operations, an initial road survey of the area will be performed. Each member should be equipped with two radiation survey meter (one primary, one backup) capable of detecting at a minimum beta and gamma radiation. Field Monitoring Kits kept by IDHS may used as necessary for this operation.

3. Field Monitoring Teams will follow a pre-selected route designated by IDHS and ISDH.

4. Team members will stop at specific points along the designated routes to take measurements with the radiological survey meters and record reading on the form – Field Monitoring Team Data Sheet (See page 98).

5. These points should be approximately one (1) mile apart, allowing for a rapid, initial survey to determine the presence of any radiological contamination.

6. Following the completion of the assessment in the County, the Field Monitoring Team will return to a designated Field Operating Center (FOC) or other designated location, and transmit a Field Monitoring Report to the State EOC and continue with other monitoring assignments as needed or required.

7. Communications with and between Field Monitoring Team members while they are conducting surveys will primarily be through cell phones and radios. The delivery of reports and other information will be completed through email and through such applications as WebEOC.

E. Field Sampling Operations

1. Field Sampling as it pertains to an Ingestion Pathway incident is the process of collecting and assessing food, produce, dairy products, water, and other potentially impacted food sources in an area designated as the Ingestion Pathway Emergency Planning Zone.

2. Jasper County will make eight (8) trained personnel available for sampling operations, which will be a total of four (4), 2-person teams. There should also be, at a minimum, 4 vehicles with which equipment and field work can be stored and conducted. In addition, each vehicle must have communications, radiological monitoring equipment, dosimeters, and other Personal Protective Equipment (PPE) deemed necessary for sampling operations.

3. The FOC, which shall be located near the impacted area, shall assign an individual from ISDH, IDEM, BOAH, or other state agency as a team leader for each of the County 2-person teams, depending upon the type of sample to be obtained.

4. When the team has arrived at the potentially impacted area to conduct monitoring operations, an initial road survey of the area will be performed. Each member should be equipped with two radiation survey meter (one primary, one backup) capable of detecting at a minimum beta and gamma radiation. Field Monitoring Kits kept by IDHS may used as necessary for this operation.

F. Sampling Operations Flow - General

1. The State Senior Health Physicist (ISDH), through consultation with the State Radiochemistry Laboratory and Jasper County, shall develop sampling teams based upon personnel that have been identified as trained or experienced in radiological sampling.

2. An FOC shall be established and Field Sampling personnel shall report to that location to receive their mission assignments and determine the availability and serviceability of equipment and materials.

3. Sampling Teams collect the assigned samples and turn samples over to the Sampling Coordinator located at or near the established FOC, and then receives a new mission assignment.

4. Samples will be stored in a secured location prior to movement to the ISDH Radiological Laboratory in Indianapolis for analysis and processing.

5. Once the Federal Radiological Monitoring Assessment Center (FRMAC) has been activated, ISDH and IDHS will coordinate for assistance with the analysis of Indiana samples collected in the impacted area and make arrangements for the transportation of those samples to pre-designated federal laboratory locations.

6. The results of laboratory analysis shall be provided to ISDH for evaluation at the State EOC and at the FOC.

G. Sampling Operations Flow – Egg Sampling Guidelines

1. Prior to exiting the vehicle at every sampling location, all team members will put on Tyvek boots and rubber gloves.

2. Select the following items from the Sampling Team Kit and place in one open storage box:

    - ☐ Towelettes
    - ☐ Sample Data Sheet
    - ☐ "Radioactive" Tape
    - ☐ Pen
    - ☐ Marker
    - ☐ 2 egg cartons
    - ☐ 1 gallon container
    - ☐ Paper Towels
    - ☐ Trash Bags (At least 4)
    - ☐ Funnel
    - ☐ Sample Bags
    - ☐ Scale
    - ☐ Duct Tape
    - ☐ Cooler with Ice
    - ☐ 1 Gallon of Clean Water in a Container

3. Carry storage box, a copy of these sampling guidelines, and a radiological survey meter to the sampling site.

4. At the sampling location, take one large plastic trash bag and place it on the ground. Place the storage box containing the sampling materials on the trash bag to prevent possible contamination.

5. Turn on survey meter and conduct a radiological survey by taking readings at waist level with the open face of the probe pointed towards the possible contamination (window open; W/O), then turn the probe over and take a reading with the face of the probe pointed away from the possible contamination (window closed; W/C). Once completed, take some final measurements at ground level, and record all of the findings on the Alpha-Beta-Gamma Exposure Rate Log.

6. Open egg cartons and collect a minimum of 24 eggs. Once the cartons are full, leave the top of the cartons open for ease of processing the samples.

7. Open a large trash bag for the waste producing while conducting the sampling and ensure the bag is folded so that it remains open.

8. Open a 1 gal container and place a funnel in the mouth of container and begin breaking eggs into the funnel.

9. Collect 2-4 lbs of eggs using ladle. Use the scale to weigh container to ensure 2-4 lbs of egg product is retrieved. Take care not to contaminate scale.

10. Clean off ladle using towelettes. Wipe off ladle from area of least contamination to area of greatest contamination. Use only one side of towelette. Use as many towelettes as necessary. Place used towellettes in waste bag.

11. Check ladle and gloves for contamination.

12. Place ladle in storage box if contamination is not present. If contamination is present, repeat item 10 above. If gloves are contaminated, change rubber gloves.

13. Clean funnel. Wipe off funnel from area of least contamination to area of greatest contamination. Use only one side of towellette. Use as many towelettes as necessary. Place used towellettes in waste bag. (Dispose of towelettes into trash bag).

14. Check funnel and Team Leader's gloves for contamination.

15. Place funnel in storage box if no contamination. If contamination present, repeat item 13 above. If gloves are contaminated, change rubber gloves.

16. Secure top on container and clean exterior by wiping off container from area of least contamination to area of greatest contamination using paper towels and moist toweletes. Use as many towels and towelettes as necessary. Place used towels and towelettes in waste bag once cleaning is complete.

17. Check container and gloves for contamination. If contamination present, repeat item16 again. If gloves are contaminated, change rubber gloves.

18. Retrieve and open large trash bag and place container/cartons into plastic bag.

19. Check gloves for contamination. If contamination is present, change rubber gloves.

20. Remove air from bag and seal with duct tape.

21. Take a contact dose rate reading of sample bag and complete a Sample Data Sheet (See page 102).

22. Carry sample bag back to vehicle as well as collect storage box.

23. Pick up waste bag. Pick up plastic bag that was under storage box and dispose of in waste bag. Carry waste bag back to vehicle.

24. At vehicle, retrieve another plastic trash bag and place bagged sample and Sample Data sheet into that plastic bag

25. Remove air from bag and seal shut with tape; apply "radioactive" tape to outer bag.

26. Complete Sample tag and tape to outside bag. Place bag in trunk of vehicle.

27. All Team Members will remove tyvek boots, one at a time while another Team Member monitors foot without boot before team member places it in vehicle. Dispose of tyvek boot in trash bag inside vehicle. As gloves are removed and disposed of, also monitor hands.

28. Move to next sampling location or transport sample to FOC as directed.

H. Sampling Operations Flow - Fish Sampling Guidelines

1. Prior to exiting the vehicle at every sampling location all Team members will put on tyvek boots and rubber gloves.

2. Remove sampling equipment from kit and place the following equipment in one open storage box:

    - ☐ Sample data sheet
    - ☐ "Radioactive" tape
    - ☐ Pen,
    - ☐ Marker
    - ☐ Paper towels
    - ☐ Trash bags
    - ☐ Sample tags
    - ☐ Scale
    - ☐ Duct tape
    - ☐ Additional rubber gloves
    - ☐ Cooler with ice
    - ☐ Fishing equipment (Spear or net provide by DNR)

3. Carry storage box to sampling site as well as Sampling Team Procedures and radiological survey meter.

4. At site location, take one large plastic trash bag and place on the ground to protect storage box from contamination. Place storage box on plastic bag.

5. Turn on Survey meter and conduct radiological survey. Take readings at waist level with the open face of the probe pointed toward the possible contamination (window open; W/O), then turn the probe over and take a reading with the face of the probe pointed away from the possible contamination (window closed; W/C). Record readings on Alpha-Beta-Gamma Exposure Rate Log. Take the same readings at ground level and record on log.

6. Open 2 trash bags, one for fish and one for waste storage. Place waste bag in storage box with top folded back.

7. Collect a minimum of 4 lbs each of various species of fish (preferable game fish as one type). Place fish in bag as they are caught. Change gloves after collecting minimum of 4 lbs fish.

8. Remove air from bag and seal bag with duct tape.

9. Take a contact dose rate reading of sample bag and fill out Sample Data Sheet.

10. Carry sample bag back to vehicle as well as storage box.

11. Pick up waste bag and the plastic bag that was under storage box and dispose of in waste bag. Carry waste bag back to vehicle.

12. At vehicle, retrieve another plastic trash bag and place bagged sample and Sample Data sheet into the bag.

13. Remove air from bag and seal shut with tape; apply "radioactive" tape to outer bag.

14. Complete Sample tag and tape to outside bag. Place bag in cooler in trunk of vehicle.

15. All Team Members will remove tyvek boots, one at a time while another Team Member monitors foot without boot before team member places it in vehicle. Dispose of tyvek boot in trash bag inside vehicle. As gloves are removed and disposed of, also monitor hands.

16. Move to next sampling location or transport sample to FOC as directed.

I. Sampling Operations Flow - Forage and Pasture Sampling Guidelines

1. Prior to exiting the vehicle at every sampling location all Team members will put on tyvek boots and rubber gloves.

2. Remove sampling equipment from kit and place the following equipment in one open storage box:

    - ☐ *Towelettes
    - ☐ Sample data sheet
    - ☐ Red spray paint
    - ☐ "Radioactive" tape,
    - ☐ Pen
    - ☐ Marker
    - ☐ Paper towels
    - ☐ Trash bags
    - ☐ Grass shears
    - ☐ Sample tags
    - ☐ String
    - ☐ Duct tape
    - ☐ Tape measure
    - ☐ Cooler with ice
    - ☐ Additional rubber gloves

3. Carry storage box to sampling site as well as Sampling Team Procedures and radiological survey meter.

4. At site location, take one large plastic trash bag and place on the ground to protect storage box from contamination. Place storage box on plastic bag.

5. Turn on Survey meter and conduct radiological survey. Take readings at waist level with the open face of the probe pointed toward the possible contamination (window open; W/O), then turn the probe over and take a reading with the face of the probe pointed away from the possible contamination (window closed; W/C). Record readings on Alpha-Beta-Gamma Exposure Rate Log. Take the same readings at ground level and record on log.

6. Open 2 large trash bags. Place waste storage bag in storage box with top folded back.

7. Use tape measure to measure out a 1 x 1 meter square area, using string or paint to mark area. Use grass shears to remove all vegetation within area down to within 1/2 inch of ground.

8. Clean off shears using towelettes. Wipe off shears from area of least contamination to area of greatest contamination. Use only one side of towelette. Use as many towelettes as necessary. Place used towellettes in waste bag.

9. Check grass shears for contamination and place grass shears in storage box if no contamination. If contamination present, do (h) above again. Carefully place vegetation into plastic bag.

10. Check gloves for contamination and if contamination is present, change rubber gloves.

11. Remove air from bag and seal with duct tape.

12. Take a contact dose rate reading of sample bag and fill out Sample Data Sheet.

13. Carry sample bag back to vehicle as well as storage box and carry back to vehicle.

14. Pick up waste bag and the plastic bag that was under storage box and dispose of in waste bag. Carry waste bag back to vehicle.

15. At vehicle, retrieve another plastic trash bag and place bagged sample and Sample Data sheet into plastic bag.

16. Remove air from bag and seal shut with tape; apply "radioactive" tape to outer bag.

17. Complete Sample tag and tape to outside bag. Place bag in trunk of vehicle.

18. All Team Members will remove tyvek boots, one at a time while another Team Member monitors foot without boot before team member places it in vehicle. Dispose of tyvek boot in trash bag inside vehicle. As gloves are removed and disposed of, also monitor hands.

19. Move to next sampling location or transport sample to FOC as directed.

J. Sampling Operations Flow - Fresh or Dried Fruits and Vegetables Sampling Guidelines

1. Prior to exiting the vehicle at every sampling location all Team members will put on tyvek boots and rubber gloves.

2. Remove sampling equipment from kit and place the following equipment in one open storage box:

    - ☐ Towelettes
    - ☐ Sample data sheet
    - ☐ "Radioactive" tape
    - ☐ Pen
    - ☐ Marker
    - ☐ Paper towels
    - ☐ Trash bags
    - ☐ Grass shears
    - ☐ Sample tags
    - ☐ Scale
    - ☐ Duct tape
    - ☐ Cooler with ice
    - ☐ Additional rubber gloves

3. Carry storage box to sampling site as well as Sampling Team Procedures and radiological survey meter.

4. At site location, take one large plastic trash bag and place on the ground to protect storage box from contamination. Place storage box on plastic bag.

5. Turn on Survey meter and conduct radiological survey. Take readings at waist level with the open face of the probe pointed toward the possible contamination (window open; W/O), then turn the probe over and take a reading with the face of the probe pointed away from the possible contamination (window closed; W/C). Record readings on Alpha-Beta-Gamma Exposure Rate Log. Take the same readings at ground level and record on log.

6. Open 2 large trash bags. Place waste storage bag in storage box with top folded back.

7. Collect minimum of 4 lbs of edible portion of plant materials (e.g. leafage, tubers, fruits, flowers, etc.) using grass shears to cut. Place sample into bag. Weigh bag with scale to insure minimum of 4 lbs.

8. Clean off shears using towelettes. Wipe off shears from area of least contamination to area of greatest contamination. Use only one side of towelette. Use as many towelettes as necessary. Place used towellettes in waste bag.

9. Check grass shears for contamination. Place grass shears in storage box if no contamination. If contamination present, do (h) above again.

10. Check gloves for contamination. If contamination is present, change rubber gloves.

11. Remove air from bag. Seal bag with duct tape.

12. Take a contact dose rate reading of sample bag and fill out Sample Data Sheet.

13. Carry sample bag back to vehicle as well as the storage box.

14. Pick up waste bag and the plastic bag that was under storage box and dispose of in waste bag. Carry waste bag back to vehicle.

15. At vehicle, retrieve another plastic trash bag place bagged sample and Sample Data sheet into plastic bag.

16. Remove air from bag and seal shut with tape; apply "radioactive" tape to outer bag.

17. Complete Sample tag and tape to outside bag. Place bag in trunk of vehicle.

18. All Team Members will remove tyvek boots, one at a time while another Team Member monitors foot without boot before team member places it in vehicle. Dispose of tyvek boot in trash bag inside vehicle. As gloves are removed and disposed of, also monitor hands.

19. Move to next sampling location or transport sample to FOC as directed.

K. Sampling Operations Flow - Green Chop Sampling Guidelines (Vegetation other than forage and pasture)

1. Prior to exiting the vehicle at every sampling location all Team members will put on tyvek boots and rubber gloves.

2. Remove sampling equipment from kit and place the following equipment in one open storage box:

    - ☐ Towelettes
    - ☐ Sample data sheet
    - ☐ "Radioactive" tape
    - ☐ Pen
    - ☐ Marker
    - ☐ Paper towels
    - ☐ Trash bags
    - ☐ Grass shears
    - ☐ Sample tags
    - ☐ String,
    - ☐ Duct tape
    - ☐ Tape measure
    - ☐ Cooler with ice
    - ☐ Additional rubber gloves

3. Carry storage box to sampling site as well as Sampling Team Procedures and radiological survey meter.

4. At site location, take one large plastic trash bag and place on the ground to protect storage box from contamination. Place storage box on plastic bag.

5. Turn on Survey meter and conduct radiological survey. Take readings at waist level with the open face of the probe pointed toward the possible contamination (window open; W/O), then turn the probe over and take a reading with the face of the probe pointed away from the possible contamination (window closed; W/C). Record readings on Alpha-Beta-Gamma Exposure Rate Log. Take the same readings at ground level and record on log.

6. Open 2 large trash bags. Place waste storage bag in storage box with top folded back.

7. Use grass shears to cut vegetation. Collect at a minimum four lbs. Place vegetation in plastic bag.Weigh bag with scale to insure minimum of 4 lbs.

8. Clean off shears using towelettes. Wipe off shears from area of least contamination to area of greatest contamination. Use only one side of towelette. Use as many towelettes as necessary. Place used towellettes in waste bag.

9. Check grass shears for contamination. Place grass shears in storage box if no contamination. If contamination present, do (h) above again.

10. Check gloves for contamination. If contamination present, change rubber gloves.

11. Remove air from sample bag and seal with duct tape.

12. Take a contact dose rate reading of sample bag and fill out Sample Data Sheet.

13. Carry sample bag back to vehicle as well as the storage box.

14. Pick up waste bag and the plastic bag that was under storage box and dispose of in waste bag. Carry waste bag back to vehicle.

15. At vehicle retrieve another plastic trash bag place bagged sample and Sample Data sheet into plastic bag held by

16. Remove air from bag and seal shut with tape; apply "radioactive" tape to outer bag. Complete Sample tag and tape to outside bag. Place bag in trunk of vehicle.

17. All Team Members will remove tyvek boots, one at a time while another Team Member monitors foot without boot before team member places it in vehicle. Dispose of tyvek boot in trash bag inside vehicle. As gloves are removed and disposed of, also monitor hands.

18. Move to next sampling location or transport sample to FOC as directed.

L. Sampling Operations Flow - Grain Sampling Guidelines

1. Prior to exiting the vehicle at every sampling location all Team members will put on tyvek boots and rubber gloves.

2. Remove sampling equipment from kit and place the following equipment in one open storage box:

    - ☐ Towelettes,
    - ☐ Sample data sheet
    - ☐ "Radioactive" tape pen
    - ☐ Marker
    - ☐ Paper towels
    - ☐ Trash bags
    - ☐ Sample tags,
    - ☐ Sample probe (or ladle)
    - ☐ Scale
    - ☐ Duct tape
    - ☐ Additional rubber gloves

3. Carry storage box to sampling site as well as Sampling Team Procedures and radiological survey meter.

4. At site location, take one large plastic trash bag and place on the ground to protect storage box from contamination. Place storage box on plastic bag.

5. Turn on Survey meter and conduct radiological survey. Take readings at waist level with the open face of the probe pointed toward the possible contamination (window open; W/O), then turn the probe over and take a reading with the face of the probe pointed away from the possible contamination (window closed; W/C). Record readings on Alpha-Beta-Gamma Exposure Rate Log. Take the same readings at ground level and record on log.

6. Open 2 large trash bags. Place waste storage bag in storage box with top folded back.

7. Collect 4 -5 lbs of grain using sample probe or ladle. Place sample into bag. Weigh bag with scale to insure minimum of 4 lbs.

8. Clean off probe (or ladle) shears using towelettes. Wipe off probe from area of least contamination to area of greatest contamination. Use only one side of towelette. Use as many towelettes as necessary. Place used towellettes in waste bag.

9. Check grain probe (or ladle) for contamination. Place grain probe (or ladle) in storage box if no contamination. If contamination is present, do (h) above again.

10. Check Team Leader's gloves for contamination. If contamination present, change rubber gloves.

11. Remove air from bag and to seal with duct tape.

12. Take a contact dose rate reading of sample bag. Fill out Sample Data Sheet.

13. Carry sample bag back to vehicle as well as the and storage box.

14. Pick up waste bag and the plastic bag that was under storage box and dispose of in waste bag. Carry waste bag back to vehicle.

15. At vehicle, retrieve another plastic trash bag and open. Place bagged sample and Sample Data sheet into plastic bag.

16. Remove air from bag and seal shut with tape; apply "radioactive" tape to outer bag. Complete Sample tag and tape to outside bag. Place bag in trunk of vehicle.

17. All Team Members will remove tyvek boots, one at a time while another Team Member monitors foot without boot before team member places it in vehicle. Dispose of tyvek boot in trash bag inside vehicle. As gloves are removed and disposed of, also monitor hands.

18. Move to next sampling location or transport sample to FOC as directed.

M. Sampling Operations Flow - Meat/Meat Product Sampling Guidelines

1. Prior to exiting the vehicle at every sampling location all Team members will put on tyvek boots and rubber gloves.

2. Remove sampling equipment from kit and place the following equipment in one open storage box:

    - ☐ Sample data sheet
    - ☐ "Radioactive" tape
    - ☐ Pen
    - ☐ Marker
    - ☐ Paper towels
    - ☐ Trash bags
    - ☐ Sample tags
    - ☐ Scale
    - ☐ Duct tape
    - ☐ Cooler with ice
    - ☐ Additional rubber gloves

3. Carry storage box to sampling site as well as Sampling Team Procedures and radiological survey meter.

4. At site location, take one large plastic trash bag and place on the ground to protect storage box from contamination. Place storage box on plastic bag.

5. Turn on Survey meter and conduct radiological survey. Take readings at waist level with the open face of the probe pointed toward the possible contamination (window open; W/O), then turn the probe over and take a reading with the face of the probe pointed away from the possible contamination (window closed; W/C). Record readings on Alpha-Beta-Gamma Exposure Rate Log. Take the same readings at ground level and record on log.

6. Open 2 large trash bags. Place waste storage bag in storage box with top folded back.

7. Collect a minimum of 4 lbs of meat/meat product (without preservatives). Place meat sample in bag. Change gloves after collecting minimum of 4 lbs meat. Weigh bag with scale as meat is put in to insure minimum of 4 lbs.

8. Remove air from bag seal with duct tape.

9. Take a contact dose rate reading of sample bag. Fill out Sample Data Sheet.

10. Carry sample bag back to vehicle as well as the storage box.

11. Pick up waste bag and the plastic bag that was under storage box and dispose of in waste bag. Carry waste bag back to vehicle.

12. At vehicle, place storage box into vehicle. Get another plastic trash bag and open. Place bagged sample and Sample Data sheet into plastic bag.

13. Remove air from bag. Seal shut with tape; apply "radioactive" tape to outer bag. Complete Sample tag and tape to outside bag. Place bag in cooler in trunk of vehicle.

14. All Team Members will remove tyvek boots, one at a time while another Team Member monitors foot without boot before team member places it in vehicle. Dispose of tyvek boot in trash bag inside vehicle. As gloves are removed and disposed of, also monitor hands.

15. Move to next sampling location or transport sample to FOC as directed.

N. Sampling Operations Flow - Milk Sampling Guidelines

1. Prior to exiting the vehicle at every sampling location all Team members will put on tyvek boots and rubber gloves.

2. Remove sampling equipment from kit and place the following equipment in one open storage box:

    - ☐ Towelettes
    - ☐ Sample data sheet
    - ☐ "Radioactive" tape pen
    - ☐ Marker
    - ☐ 1 gal container
    - ☐ Duct tape
    - ☐ Paper towels
    - ☐ Trash bags
    - ☐ Funnel
    - ☐ Sample tags
    - ☐ Ladle
    - ☐ Additional rubber gloves
    - ☐ Cooler with ice
    - ☐ 1 gallon clean water in container

3. Carry storage box to sampling site as well as Sampling Team Procedures and radiological survey meter.

4. At site location, take one large plastic trash bag and place on the ground to protect storage box from contamination. Place storage box on plastic bag.

5. Turn on Survey meter and conduct radiological survey. Take readings at waist level with the open face of the probe pointed toward the possible contamination (window open; W/O), then turn the probe over and take a reading with the face of the probe pointed away from the possible contamination (window closed; W/C). Record readings on Alpha-Beta-Gamma Exposure Rate Log. Take the same readings at ground level and record on log.

6. Open 2 large trash bags. Place waste storage bag in storage box with top folded back.

7. Open large trash bag for waste storage and place in storage box with top folded back.

8. Open 1 gal container. Take funnel from storage box. Rinse funnel with chlorine bactericide (Clorox bleach) (100ppm for 30 seconds). Place funnel in mouth of container. Take ladle from storage and rinse with chlorine bactericide (100 ppm for 30 seconds).

9. Have agitator turned on in milk tank and let run for 5 - 10 minutes. Lift up lid on milk tank. Dip ladle into milk at least 6" below surface. Fill up 1 gallon container with milk.

10. Clean off ladle using towels and towelettes. Wipe off ladle from area of least contamination to area of greatest contamination. Use only one side of towelette. Use as many towelettes as necessary. Place used towellettes in waste bag. Check ladle and Team Leader's gloves for contamination.

11. Place ladle in storage box if no contamination. If contamination present do (j) above again. If gloves are contaminated, change rubber gloves.

12. Wipe off funnel from area of least contamination to area of greatest contamination. Use only one side of towel or towelette. Use as many towelettes as necessary. Place used towellettes in waste bag. (Dispose of towelettes into trash bag).

13. Check funnel gloves for contamination. Place funnel in storage box if no contamination. If contamination present, do (j) above again. If gloves are contaminated, change rubber gloves.

14. Secure top on container. Clean container. Wipe off container from area of least contamination to area of greatest contamination using paper towels. Use only one side of towel. Use as many towels as necessary. Place used towels in waste bag.

15. Check container and gloves for contamination. If contamination present, do (n) above again. If gloves are contaminated, change rubber gloves.

16. Retrieve and open large trash bag. Place container into plastic bag.

17. Check gloves for contamination. If contamination present, change rubber gloves.

18. Remove air from bag and seal with duct tape.

19. Take a contact dose rate reading of sample bag and fill out Sample Data Sheet.

20. Carry sample bag back to vehicle as well as the storage box.

21. Pick up waste bag and the plastic bag that was under the storage box and dispose of in waste bag. Carry waste bag back to vehicle. At vehicle, retrieve another plastic trash bag and open and place bagged sample and Sample Data sheet into plastic bag.

22. Remove air from bag and seal shut with tape; apply "radioactive" tape to outer bag. Complete Sample tag and tape to outside bag. Place bag in cooler in trunk of vehicle.

23. All Team Members will remove tyvek boots, one at a time while another Team Member monitors foot without boot before team member places it in vehicle. Dispose of tyvek boot in trash bag inside vehicle. As gloves are removed and disposed of, also monitor hands.

24. Move to next sampling location or transport sample to FOC as directed.

O. Sampling Operations Flow - Snow Sampling Guidelines

1. Prior to exiting the vehicle at every sampling location all Team members will put on tyvek boots and rubber gloves.

2. Remove sampling equipment from kit and place the following equipment in one open storage box:

    - ☐ Towelettes
    - ☐ Sample data sheet
    - ☐ Spray paint
    - ☐ "Radioactive" tape
    - ☐ Pen
    - ☐ Marker
    - ☐ Paper towels,
    - ☐ Trash bags
    - ☐ Sample tags
    - ☐ 1 gallon container
    - ☐ String
    - ☐ Duct tape
    - ☐ Tape measure
    - ☐ Additional rubber gloves
    - ☐ Cooler with ice
    - ☐ Hand trowel

3. Carry storage box to sampling site as well as Sampling Team Procedures and radiological survey meter.

4. At site location, take one large plastic trash bag and place on the ground to protect storage box from contamination. Place storage box on plastic bag.

5. Turn on Survey meter and conduct radiological survey. Take readings at waist level with the open face of the probe pointed toward the possible contamination (window open; W/O), then turn the probe over and take a reading with the face of the probe pointed away from the possible contamination (window closed; W/C). Record readings on Alpha-Beta-Gamma Exposure Rate Log. Take the same readings at ground level and record on log.

6. Open 2 large trash bags. Place waste storage bag in storage box with top folded back.

7. Open 1 gal container. Place funnel in container mouth.

8. Use tape measure to measure out a 1 x 1 meter (39 inches) square area, using string or spray paint to mark area. Use hand trowel to remove all snow within area to a depth of 1 inch.

9. Clean off hand trowel using towelettes. Wipe off hand trowel from area of least contamination to area of greatest contamination. Use only one side of towelette. Use as many towelettes as necessary. Place used towellettes in waste bag.

10. Check hand trowel and gloves for contamination. Place hand trowel in storage box if no contamination. If contamination is present, do (i) above again. If gloves are contaminated, change rubber gloves.

11. Wipe off funnel from area of least contamination to area of greatest contamination. Use only one side of towel or towelette. Use as many towelettes as necessary. Place used towellettes in waste bag. (Dispose of towelettes into trash bag). Check funnel and gloves for contamination.

12. Place funnel in storage box if no contamination. If contamination is present, do (k) above again. If gloves are contaminated, change rubber gloves.

13. Wipe off container from area of least contamination to area of greatest contamination using paper towels. Use only one side of towel. Use as many towels as necessary. Place used towels in waste bag.

14. Check container and gloves for contamination. If contamination present, do (m) above again. If gloves are contaminated, change rubber gloves.

15. Retrieve and open large trash bag and place container into plastic bag.

16. Check gloves for contamination. If contamination present, change rubber gloves.

17. Remove air from bag and seal with duct tape.

18. Take a contact dose rate reading of sample bag and fill out Sample Data Sheet.

19. Carry sample bag back to vehicle as well as the storage box.

20. Pick up waste bag and the plastic bag that was under storage box and dispose of in waste bag. Carry waste bag back to vehicle.

21. At vehicle, retrieve another plastic trash bag and place bagged sample and Sample Data sheet into plastic bag held.

22. Remove air from bag and seal shut with tape; apply "radioactive" tape to bag. Complete Sample tag and tape to outside bag. Place bag in trunk of vehicle.

23. All Team Members will remove tyvek boots, one at a time while another Team Member monitors foot without boot before team member places it in vehicle. Dispose of tyvek boot in trash bag inside vehicle. As gloves are removed and disposed of, also monitor hands.

24. Move to next sampling location or transport sample to FOC as directed

P. Sampling Operations Flow - Soil Sampling Guidelines

1. Prior to exiting the vehicle at every sampling location all Team members will put on tyvek boots and rubber gloves.

2. Remove sampling equipment from kit and place the following equipment in one open storage box:

- ☐ Towelettes
- ☐ Sample data sheet
- ☐ "Radioactive" tape
- ☐ Pen
- ☐ Marker
- ☐ Paper towels,
- ☐ Trash bags
- ☐ Grass shears
- ☐ Sample tags
- ☐ 1 gallon container
- ☐ String
- ☐ Red Spray Paint
- ☐ Duct tape
- ☐ Tape measure
- ☐ Additional rubber gloves
- ☐ Cooler with ice
- ☐ Hand shovel

3. Carry storage box to sampling site as well as Sampling Team Procedures and radiological survey meter.

4. At site location, take one large plastic trash bag and place on the ground to protect storage box from contamination. Place storage box on plastic bag.

5. Turn on Survey meter and conduct radiological survey. Take readings at waist level with the open face of the probe pointed toward the possible contamination (window open; W/O), then turn the probe over and take a reading with the face of the probe pointed away from the possible contamination (window closed; W/C). Record readings on Alpha-Beta-Gamma Exposure Rate Log. Take the same readings at ground level and record on log.

6. Open 2 large trash bags. Place waste storage bag in storage box with top folded back.

7. Use tape measure to measure out a 1 x 1 meter (39 inches) square area, using red spray paint to mark area. Use grass shears to remove all vegetation within area as well as other debris and stones larger than one centimeter.

8. Clean off shears using towelettes. Wipe off shears from area of least contamination to area of greatest contamination. Use only one side of towelette. Use as many towelettes as necessary. Place used towellettes in waste bag.

9. Check shears and gloves for contamination. Place hand trowel in storage box if no contamination. If contamination is present, do (i) above again. If gloves are contaminated, change rubber gloves.

10. Using hand shovel, collect al the soil in the area to a depth of ½ inch. Carefully place soil into plastic bag.

11. Clean off hand shovel with towelettes. Wipe off shovel from area of least contamination to area of greatest contamination. Use only one side of towel or towelette. Use as many towelettes as necessary. Place used towellettes in waste bag. (Dispose of towelettes into trash bag). Check shovel and gloves for contamination.

12. Place hand shovel in storage box if no contamination. If contamination is present, do (k) above again. If gloves are contaminated, change rubber gloves.

13. Secure top on container. Wipe off container from area of least contamination to area of greatest contamination using paper towels. Use only one side of towel. Use as many towels as necessary. Place used towels in waste bag.

14. Check container and gloves for contamination. If contamination present, do (m) above again. If gloves are contaminated, change rubber gloves.

15. Retrieve and open large trash bag and place container into plastic bag.

16. Check gloves for contamination. If contamination present, change rubber gloves.

17. Remove air from bag and seal with duct tape.

18. Take a contact dose rate reading of sample bag and fill out Sample Data Sheet.

19. Carry sample bag back to vehicle as well as the storage box.

20. Pick up waste bag and the plastic bag that was under storage box and dispose of in waste bag. Carry waste bag back to vehicle.

21. At vehicle, retrieve another plastic trash bag and place bagged sample and Sample Data sheet into plastic bag held.

22. Remove air from bag and seal shut with tape; apply "radioactive" tape to outer bag. Complete Sample tag and tape to outside bag. Place bag in trunk of vehicle.

23. All Team Members will remove tyvek boots, one at a time while another Team Member monitors foot without boot before team member places it in vehicle. Dispose of tyvek boot in trash bag inside vehicle. As gloves are removed and disposed of, also monitor hands.

24. Move to next sampling location or transport sample to FOC as directed

Q. Sampling Operations Flow - Water Sampling Guidelines

1. Prior to exiting the vehicle at every sampling location all Team members will put on tyvek boots and rubber gloves.

2. Remove sampling equipment from kit and place the following equipment in one open storage box:

    - ☐ Towelettes
    - ☐ Sample data sheet
    - ☐ "Radioactive" tape
    - ☐ Pen
    - ☐ Marker
    - ☐ 1 gal container
    - ☐ Duct tape
    - ☐ Paper towels
    - ☐ Trash bags
    - ☐ Funnel
    - ☐ Sample tags
    - ☐ Ladle
    - ☐ Additional rubber gloves
    - ☐ Cooler with ice
    - ☐ 1 gallon clean water in container

3. Carry storage box to sampling site as well as Sampling Team Procedures and radiological survey meter.

4. At site location, take one large plastic trash bag and place on the ground to protect storage box from contamination. Place storage box on plastic bag.

5. Turn on Survey meter and conduct radiological survey. Take readings at waist level with the open face of the probe pointed toward the possible contamination (window open; W/O), then turn the probe over and take a reading with the face of the probe pointed away from the possible contamination (window closed; W/C). Record readings on Alpha-Beta-Gamma Exposure Rate Log. Take the same readings at ground level and record on log.

6. Open 2 large trash bags. Place waste storage bag in storage box with top folded back.

7. Open large trash bag for waste storage and place in storage box with top folded back.

8. Open 1 gal container. Take funnel from storage box. Fill up the container with water from the sampling location

9. Clean off ladle using towels and towelettes. Wipe off ladle from area of least contamination to area of greatest contamination. Use only one side of towelette. Use as many towelettes as necessary. Place used towellettes in waste bag. Check ladle and gloves for contamination.

10. Place ladle in storage box if no contamination. If contamination present do (j) above again. If gloves are contaminated, change rubber gloves.

11. Wipe off funnel from area of least contamination to area of greatest contamination. Use only one side of towel or towelette. Use as many towelettes as necessary. Place used towellettes in waste bag. (Dispose of towelettes into trash bag).

12. Check funnel and gloves for contamination. Place funnel in storage box if no contamination. If contamination present, do (j) above again. If gloves are contaminated, change rubber gloves.

13. Secure top on container. Wipe off container from area of least contamination to area of greatest contamination using paper towels. Use only one side of towel. Use as many towels as necessary. Place used towels in waste bag.

14. Check container and gloves for contamination. If contamination present, do (n) above again. If gloves are contaminated, change rubber gloves.

15. Retrieve and open large trash bag. Place container into plastic bag.

16. Check gloves for contamination. If contamination present, change rubber gloves.

17. Remove air from bag and seal with duct tape.

18. Take a contact dose rate reading of sample bag and fill out Sample Data Sheet.

19. Carry sample bag back to vehicle as well as the storage box.

20. Pick up waste bag and the plastic bag that was under the storage box and dispose of in waste bag. Carry waste bag back to vehicle. At vehicle, retrieve another plastic trash bag and open and place bagged sample and Sample Data sheet into plastic bag.

21. Remove air from bag and seal shut with tape; apply "radioactive" tape to outer bag. Complete Sample tag and tape to outside bag. Place bag in cooler in trunk of vehicle.

22. All Team Members will remove tyvek boots, one at a time while another Team Member monitors foot without boot before team member places it in vehicle.

23. Dispose of tyvek boot in trash bag inside vehicle. As gloves are removed and disposed of, also monitor hands.

24. Move to next sampling location or transport sample to FOC as directed.

R. Sampling Operations Flow - Wildlife Sampling Guidelines

1. Prior to exiting the vehicle at every sampling location all Team members will put on tyvek boots and rubber gloves.

2. Remove sampling equipment from kit and place the following equipment in one open storage box:

    - ☐ Towelettes
    - ☐ Sample data sheet
    - ☐ "Radioactive" tape
    - ☐ Pen
    - ☐ Marker
    - ☐ Duct tape
    - ☐ Paper towels
    - ☐ Trash bags
    - ☐ Funnel
    - ☐ Sample tags
    - ☐ Additional rubber gloves
    - ☐ Face and/or eye protection
    - ☐ Hunting equipment (Traps or snares – DNR)

3. Carry storage box to sampling site as well as Sampling Team Procedures and radiological survey meter.

4. At site location, take one large plastic trash bag and place on the ground to protect storage box from contamination. Place storage box on plastic bag.

5. Turn on Survey meter and conduct radiological survey. Take readings at waist level with the open face of the probe pointed toward the possible contamination (window open; W/O), then turn the probe over and take a reading with the face of the probe pointed away from the possible contamination (window closed; W/C). Record readings on Alpha-Beta-Gamma Exposure Rate Log. Take the same readings at ground level and record on log.

6. Open 2 large trash bags. Place waste storage bag in storage box with top folded back.

7. Open large trash bag for waste storage and place in storage box with top folded back.

8. Collect various species of wildlife (preferably game animals – road kill can be used). Place in sample bag. If animal is too large to place in bag, tear bags apart and tape around the carcass. Change gloves after collecting sample.

9. Remove air from bag and seal with duct tape.

10. Take a contact dose rate reading of sample bag and fill out Sample Data Sheet.

11. Carry sample bag back to vehicle as well as the storage box.

12. Pick up waste bag and the plastic bag that was under the storage box and dispose of in waste bag. Carry waste bag back to vehicle. At vehicle, retrieve another plastic trash bag and open and place bagged sample and Sample Data sheet into plastic bag.

13. Remove air from bag and seal shut with tape; apply "radioactive" tape to outer bag. Complete Sample tag and tape to outside bag. Place bag in cooler in trunk of vehicle.

14. All Team Members will remove tyvek boots, one at a time while another Team Member monitors foot without boot before team member places it in vehicle. Dispose of tyvek boot in trash bag inside vehicle. As gloves are removed and disposed of, also monitor hands.

15. Move to next sampling location or transport sample to FOC as directed.

S. Radiological Field Equipment Calibration and Inspection Guidelines

1. Radiation Detection Equipment Calibration - All Radiation Detection Equipment will be calibrated per the manufacturer's instruction. IDHS is responsible for the calibration of local government equipment used for Ingestion Thermo FH40 G-L instruments. ISDH survey instruments (other than the Ludlum Model 3s issued by IDHS) will be the responsibility of ISDH.

2. Radiological Detection Equipment Inspection - All Radiation Detection Equipment will be inspected, inventoried and operationally checked by local Emergency Management Directors or Responders at least once each calendar quarter. Any shortages or problems will be reported to the Indiana REP Coordinator immediately.

3. Sampling Team Equipment Inspection - All Sampling Team Equipment will be inspected, inventoried and operationally checked by local Emergency Management Directors or Responders at least once each calendar quarter. Any shortages or problems will be reported to the Indiana REP Program Manager immediately.

STANDARD OPERATING GUIDELINES

Exercises, Drills, Training, and Plan Maintenance

A. Purpose

These guidelines were developed as a tool to assist Jasper County personnel in conducting the following actions as they relate to Ingestion Pathway preparedness: exercises and drills to validate policies, plans, and procedures; development and delivery to training for the personnel support and responding to radiological incidents; and the maintenance, review, and updates required to establish viable Ingestion Pathway Plans.

B. Scope

The procedure shall apply to the following Emergency Classification Levels:

1. An Alert – Events are in process or have occurred which indicate an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are expected to be limited to small fractions of EPA Protective Action Guideline exposure levels.

2. A Site Area Emergency – Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile action that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of, or 2) that prevent effective access to equipment needed for the protection of the public. Any releases beyond the site boundary are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels.

3. A General Emergency – Event(s) are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

C. Background

These guidelines have been developed for those potential radiological incidents occurring at the Braidwood, Illinois facility, which poses an ingestion pathway risk to Jasper County.

These guidelines were established to ensure the appropriate coordination and management of essential County personnel in response and support activities.

D. Exercises

1. Jasper County will conduct periodic radiological exercise in compliance with all applicable FEMA and DOE requirements.

2. Compliance with the Homeland Security Exercise and Evaluation Program (HSEEP) will shape, guide, and direct the development of radiological exercises.

    a. HSEEP is a capabilities and performance-based exercise program that provides a standardized methodology and terminology for exercise design, development, conduct, evaluation, and improvement planning.

    b. It constitutes a national standard for all exercises. Through exercises, the National Exercise Program, supports organization to achieve objective assessments are identified, corrected, and shared as appropriate prior to a real incident.

    c. An After Action Review will be conducted at the conclusion of each exercise to evaluate the performance of state and local emergency personnel. The review will be conducted as soon as practical after the exercise. It will be followed by a formal, written evaluation, an After Action Report, of the response capability of each agency participating in the exercise.

    d. In most cases, information from HSEEP compliant exercises can be placed on the HSEEP website for sharing and collaboration with partner agencies and to ensure compliance with reporting procedures from FEMA.

    e. At a minimum, Jasper County will conduct a table top exercise to evaluate this plan and procedures as well as the County's ingestion pathway capabilities.

    f. A full-scale ingestion pathway exercise shall be conducted every six ears to evaluate multi-agency coordination and capabilities.

E. Drills

1. Periodic drills are conducted to develop and maintain key emergency response skills. Deficiencies identified as a result of these drills are followed up by creating a list of such deficiencies and correcting them by procedure changes and/or training.

2. Communications drills of the entire emergency communications system will be conducted quarterly at a minimum.

3. Field Monitoring and Radiological Assessment drills should be held annually.

4. A drill is defined as a supervised instruction period aimed at testing, developing, and maintaining skills in a particular operation. A drill can be a component of an exercise.

F. Training

A training program to support this plan will provide a uniform instruction for County agencies and personnel who may be expected to respond to a nuclear incident. The County shall coordinate with IDHS and ISDH for the conduct and delivery of required training and will also look to the individual utility (ies) that can provide for support in provide information that can orient personnel on key goals and objectives for Ingestion Pathway response.

1. Training on this plan, its organization, and its response systems will be necessary to effectively meet the challenges that stem from an Ingestion Pathway incident.

2. Training of field personnel in sample collection and handling, record keeping, and transportation procedures will enable accurate testing and evaluation of potential risks to community food sources.

3. Training should also include the key and necessary actions for the protection of the public against radiological exposure through contact with potentially contaminated sources.

4. Training will be conducted on these topics and many others as they pertain to radiological incident on an annual basis.

G. Plan Maintenance

1. Responsibility

   a. The Jasper County Emergency Management Agency is responsible for the coordinating the update, review, and revision of this document.

   b. The Jasper County Ingestion Pathway Plan shall be considered a Hazard-Specific Annex to the Jasper County Comprehensive Emergency Management Plan.

c. The Jasper County Emergency Management Agency shall keep the dissemination of this document limited to only those personnel who have a designated responsibility to perform response actions, due to the sensitive nature of a radiological incident and potential missions required by County personnel.

d. This document shall be reviewed and revised on an 18 – 24 month update cycle. However, this does preclude the need for revisions based upon real-world incidents, emergency exercises, and changes in operations and/or radiological emergency preparedness policies, procedures, and guidelines.

REFERENCE INFORMATION

Ingestion Pathway Forms

NUCLEAR EMERGENCY LABORATORY SAMPLE DATA SHEET					
Name of Individual Completing Sheet					
Type of Sample			**Lab ID #**		
Arrival at ISDH Radiochemistry Lab			**Date**		
			Time		
Write the information present on the outside of the sample in the corresponding blanks below:					
1. Collection Date			**2. Sampling Point or Location**		
Collection Time					
3. Monitoring Team #			**4 Sampling Size, including Units**		
Complete the following for air filters:					
5. Sampling Time		**6. Average flow rate (cubic feet per minute – CFM)**		**7. Flow Rate Correction Factor**	
8. Filters present		**Particulate:**		**Silverzeolite:**	
9 Volume of air sampled (Cubic Centimeters)		Volume = CFM x Min x CF x 2.83e+4 = Cubic Centimeters			
10. Analyses Requested by EOC: Gama Scans alpha beta					
11. Forwarded to EOC	**Date**	**Time**	**12. Received by EOC**	**Date**	**Time**

Master Sample Log

LAB ID NUMBER	SAMPLE INFORMATION	SAMPLE TYPE	RECEIPT DATE/TIME	ANALYZED (YES/NO)	STORED (HIGH/LOW)	COMMENTS

Sample Analysis Results Sheet

Sample Type Collected / Analyzed *(Select One)*	AI - Air	FI – Fish	SO - Soil	DW – Drinking Water
	ME – Meat	EG - Eggs	CN - Corn	FF – Fresh Fruits
	MI – Milk	PO – Poultry	HY – Hay	PG – Pasture Grass
	SF – Shell Fish	SN – Snow	GR – Grain (Milk)	DR – Direct Dose

Date Collected	Time Collected	Recorded By	Date Recorded	Time Recorded

Location Code	Location Description

Town*	State*	Grid*	Sector*	Distance*

**Required if Location Code is not known*

Lab ID	Sample ID	Date Analyzed

Radionuclide	Results: pCi/kg, pCi/I, pCi/m^3	Radionuclide	Results: pCi/kg, pCi/I, pCi/m^3	Radionuclide	Results: pCi/kg, pCi/I, pCi/m^3
H-3		Sr-91		I-132	
Cr-51		Y-91		I-133	
Mn-54		Mo-99		I-134	
Co-58		Ru-103		Cs-134	
Fe-59		Ru-106		Cs-134	
Co-60		Ag-110m		Cs-136	
Zn-65		Sb-127		Cs-137	
Sr-89		Te-129		Ba-140	
Sr-90		I-131		La-140	
Y-90		Te-132		Ce-144	

Emergency Supplies Table

Quantity	Unit	Description of Item
04	Each	Plastic Bags, refuse, 40 gallon
12	Each	Plastic Bags, medium
25	Each	Plastic Bags, small, Ziploc
02	Each	Black Markers, permanent
01	Package	Gloves, Disposable, medium
02	Package	Gloves, Disposable, large
01	Package	Boots, Disposable, tie
01	Package	Boots, Disposable, medium
04	Package	Cleaning Cloths, 2ft x 2 ft, 20/pkg
01	Roll	Masking Tape
03	Roll	Radioactive Material Tape
02	Roll	Duct Tape
01	Roll	Filament Tape
90	Each	Sample Data Sheet
01	Each	Scissors
04	Each	Sign, hanging, 4-pocket
03	Each	Ropes, red/yellow, for roping sample receiving area
02	Each	Sign: “Caution Radiation Material Area"
06	Each	Sign: "Caution Radiation Controlled Area”
04	Each	Sign: "Authorized Personnel Only”
02	Each	Sign: "Survey Meter Instructions"
50	Each	Planchets, Stainless Steel, 2"
02	Each	Ribbons, red/yellow
02	Package	Smear Wipes, 1000/pkg
01	Each	Area Monitor
01	Each	Step Off Pad
15	Each	Marrinelli Beakers, disposable, 4 liter
33	Each	Marrinelli beakers, disposable, 2 liter
06	Each	Posts, Plastic, collapsible
01	Roll	Polyethylene Film, 4 mill x 8 ft x 100 ft
01	Roll	Plastic Wrap, 18 inches x 2000 ft
10	Each	Pocket dosimeters range (200mR)
02	Each	Dosimeter Storage Case, each with a dosimeter charger
10	Each	TLD Cards
04	Each	Ludlum Model 3 with a 44-9 pancake probe
01	Each	Alarming Area Monitor, Ludlum M375
50	Each	Petri dishes, small

Sampling Team Equipment Inventory Sheet

Quantity	Unit	Description of Item
02	Each	Storage Boxes
01	Each	Scale
02	Each	Canberra MCB2 Thermo Survey Meters
03	Each	Self-Reading Personal Dosimeters (0-200 mR)
02	Each	Scissors
01	Each	12 Ft Tape Measure
01	Each	20 Ft Length of Rope
01	Roll	Tape w/ “Radioactive” printed on it
02	Boxes	Writing Pens
01	Each	Flashlight
03	Roll	Radioactive Material Tape
01	Each	Ball of String
01	Each	Hand Shovel
01	Box	Markers
01	Roll	Duct Tape
50	Each	Small Sample Bags
50	Each	Large Sample Bags
03	Pair	Coveralls
03	Pair	Work Gloves
01	Can	Red Spray Paint
01	Each	Clipboard
50	Each	Planchets, Stainless Steel, 2"
01	Roll	Mono-filament Tape
02	Each	Coolers, Large
01	Each	Grass Shear Tool
02	Each	Egg Cartons
04	Box	Assorted Foot Covers (Booties)
02	Funnels	Funnels
03	Box	Rubber Gloves
01	Each	Survival Knife
01	Quart	Chlorine Bactericide
01	Roll	Paper Towel
02	Each	Containers for Liquid Samples (1gal each)
01	Box	Towlettes
01	Each	Ladle
01	Gallon	Clean Water
01	Each	Three Ring Binder with Team Procedures
01	Each	List of Supplies
02	Pair	Eye Protection

Field Monitoring Team – Data Sheet					
Team #		**County**		**Date**	
Point Number		**Ground Level (CPM) (Beta & Gamma)**		**Waist Level (CPM) (Gamma Only)**	
Page of					

FORWARD OPERATIONS CENTER						
RECORD OF REQUESTED SAMPLES						
Sample #	Type of Sample	Collection Locations	Sampling Priority	Sampling Team Assigned	Date / Time Assigned	Date / Time Completed
Page ___ of ____						

SAMPLING TEAM – REQUESTED SAMPLE LOG						
Sample #	Date / Time Sampling Team Contacted	Type of Sample	Collection Locations	Requested Time for Collection	Actual Time of Collection	Comments (i.e. If milk, when milked and type of feed)
Sampling Team Members: _____ **Team Leader Name:**_____ **Organization:**_____						

ALPHA-BETA-GAMMA EXPOSURE RATE LOG					
Instrument Type					
Serial Number					
		CPM --OR-- mR/Hr (circle correct scale)			
		Waist Level		Ground Level	
Location or Area of Measurement	Date/Time	W/O	W/C	W/O	W/C
NOTE: On CD-V 700: W/O = beta window open; W/C = beta window closed. On Ludlum Model 3: W/O = Probe with window facing toward possible contaminated area; W/C = Probe with window facing away from possible contaminated area.					
Sampling Team Members Name:_____Organization:_____					

SAMPLE DATA SHEET

Date:_____
Collection Time_____

Type of Sample:_____
Sample Size:_____

Sampling Location (owner/fire/address/city or geographic location):_____
_____
_____
_____

Manufacturer or Distributor (name/address/city):_____
_____
_____

Remarks (sample brand, other identifying information):_____
_____
_____

Sample Collector's Name(s):_____
_____
_____

SURVEY INSTRUMENT READING

General Area Dose Rate:_____ CPM or mR/hr or R/hr (circle one)

Contact Dose Rate:_____ CPM or mR/hr or R/hr (circle one)

Milk Samples

1. Milk Farm: Class A or B_____
2. # of animals milked:_____
3. Time of Milking: _____
4. # of milkings in tank:_____
5. Size of milk tank: _____
6. Vol. of milk in tank:_____
7. Food Supply: indoors or outdoors

SAMPLE DATA SHEET (CONTINUED)

Poultry, Eggs and Meat/Meat Products Samples

1. Feeding Conditions: indoor only OR outdoor feeding of indoor feed OR outdoor feeding of outdoor feed_____

2. Number of hens in sampled laying population:_____

3. Location animal was raised in or lived in prior to obtaining sample or slaughter:

_____

Crops, Vegetables, Fruits, Forage, Pasture Samples or Green Chop

1. Size of field or orchard sample obtained from:_____

2. Size of lot (bushels, etc) sample obtained from:_____

3. Food actively in food chain? YES or NO

4. Kinds and numbers of animals consuming item:_____

5. Recent precipitation in are? YES or NO

Snow and Soil Samples

1. Depth of Snow on ground:_____

2. Amount of snowfall on day of collection:_____

3. Type of vegetation growing in soil:_____

4. Soil OR Snow from Field OR Crop area (circle appropriate items)

Fish/Wildlife Samples

1. Kind of fish/wildlife caught (species/common name):_____

2. Location fish/wildlife was caught:_____

3. Date and time fish/wildlife was caught:_____

SAMPLE DATA SHEET (CONTINUED)

Water Samples

1. Water sample taken from (water trough, stock tank, etc):_____
2. Item in # 1 - covered or open (circle one)
3. Kinds and numbers of animals drinking water:_____
4. Source of water for irrigation sprinkler (well, river, etc(:_____

Grain Samples

1. Type of Storage: silo hopper car other:_____
2. Size of storage:_____
3. Dockage: _____
4. Grade and kind:_____
5. Precise sampling location within storage area:_____
6. Recent Activities: Ventilation Turning Other:_____

Person Completing Report	Date

STATE OF INDIANA

Personnel Contamination Report

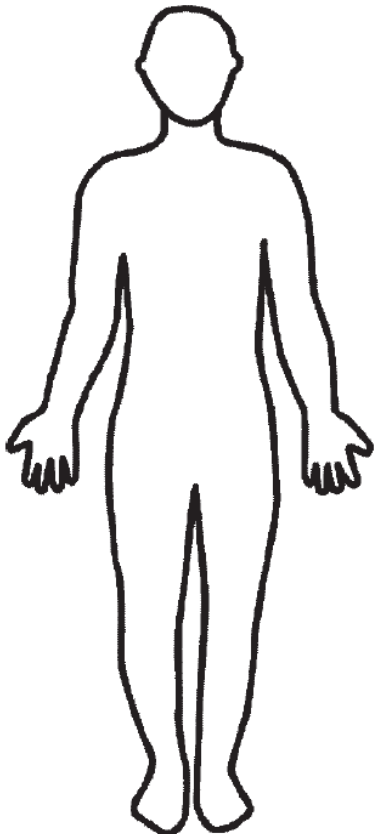
(Ingestion Pathway Planning 3-1-11)

Responder's Name _____ **Date/Time** _____

Survey taken on: ☐ **Protective Clothing** ☐ **Personal Clothing** ☐ **Skin**

Mark contamination locations on the diagrams below:

FRONT



1.
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9.
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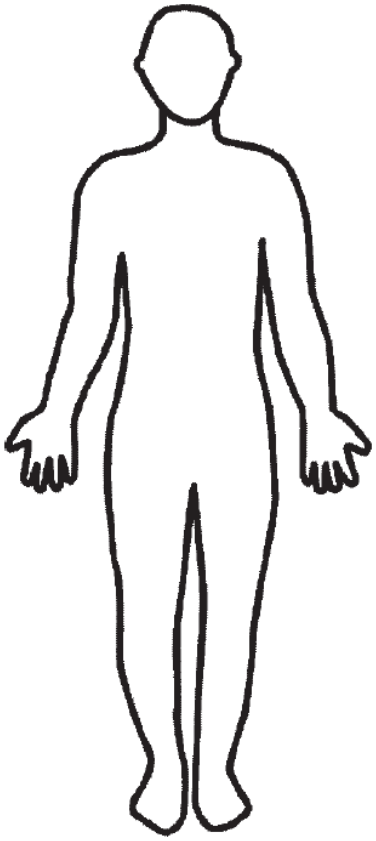
12.
13.

BACK



1.
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13.

Comments:

Monitored By: **Agency:**

Instrument Type: **Instrument S/N:**

Cal Due Date: **Probe Used:**

DOSIMETRY LOG

TEAM NUMBER

Name:________________________________ Date:__________________________

Social Security #:________________________ Dosimeter S/N____________________

Organization:__________________________ Team Assignment:_________________

DOSIMETER INFORMATION

TIME	IR						LR	TR
Reading mR/hr								

Name:________________________________ Date:__________________________

Social Security #:________________________ Dosimeter S/N____________________

Organization:__________________________ Team Assignment:_________________

DOSIMETER INFORMATION

TIME	IR						LR	TR
Reading mR/hr								

Name:________________________________ Date:__________________________

Social Security #:________________________ Dosimeter S/N____________________

Organization:__________________________ Team Assignment:_________________

DOSIMETER INFORMATION

TIME	IR						LR	TR
Reading mR/hr								

NOTES: IR = Initial Reading; TR = Total Reading

REFERENCE INFORMATION

Acronyms

List of Acronyms

- A -	
AAR	After Action Report / After Action Review
ALARA	As Low As Reasonably Achievable
AMS	Aerial Measurement System
ANI	American Nuclear Insurers
ARAC	Atmospheric Release Advisory Capability
AU	Authorized User
- B -	
BOAH	(Indiana) Board of Animal Health
BWR	Boiling Water Reactor
- C -	
CDER	Center for Drug Evaluation and Research
CEMP	Comprehensive Emergency Management Plan
CFR	Code of Federal Regulations
CGA	Compressed Gas Association
CPM	Counts Per Minute
- D -	
DFBS	(Indiana) Division of Fire and Building Safety
DHS	U.S. Department of Homeland Security
DNR	(Indiana) Department of Natural Resources
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOJ	Department of Justice
DOT	U.S. Department of Transportation
DRC	Disaster Recovery Center
- E -	
EMA	Emergency Management Agency
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
EPZ	Emergency Planning Zone
ESF	Emergency Support Function
- F -	
FCO	Federal Coordinating Officer
FCZ	Food Control Zone
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency

FOC	Forward Operating Center
FRERP	Federal Radiological Emergency Response Plan
FRMAC	Federal Radiological Monitoring and Assessment Center

- G -

GIS	Geographic Information System

- H -

HSEEP	Homeland Security Exercise and Evaluation Program
HSPD	Homeland Security Presidential Directive

- I -

IA	Individual Assistance
IAP	Incident Action Plan
ICS	Incident Command System
IDEM	Indiana Department of Environmental Management
IDHS	Indiana Department of Homeland Security
iGMS	Indiana Grants Management System
IMAT	Incident Management Assistance Team
INDOT	Indiana Department of Transportation
INNG	Indiana National Guard
IPC	Ingestion Pathway Committee
ISDH	Indiana State Department of Health
ISDHL	Indiana State Department of Health Laboratories
ISP	Indiana State Police

- J -

JFO	Joint Field Office
JIC	Joint Information Center

- M -

MACS	Multiagency Coordination System

- N -

NRC	U.S. Nuclear Regulatory Commission
NRF	National Response Framework
NUREG	Nuclear Regulation (Federal)

- O -

OISC	Office of the Indiana State Chemist (Purdue University)
OSHA	Occupational Safety and Health Administration

- P -

PA	Public Assistance
PAG	Protective Action Guideline
PDA	Preliminary Damage Assessment
PEL	Permissible Exposure Limits
PIO	Public Information Officer

PPE	Personal Protective Equipment
PWR	Pressurized Water Reactor
- R -	
RAP	Radiological Assessment Program
RASCAL	Radiological Assessment System for Consequence Analysis
REP	Radiological Emergency Preparedness Program
RSO	Radiological Safety Officer
- S -	
SAR	Search and Rescue
SBA	Small Business Administration
SCO	State Coordinating Officer
SEMA	(Indiana) State Emergency Management Agency (Now IDHS)
SOP	Standard Operating Procedure
- T -	
TSC	Technical Support Center
- U -	
USDA	U.S. Department of Agriculture
- W -	
WMD	Weapons of Mass Destruction

REFERENCE INFORMATION

Glossary of Terms

- A -

Absorbed dose:

The quantity of energy absorbed from ionization per unit mass of matter. The rad is unit of absorbed dose.

Access Control:

Refers to all activities accomplished for the purpose of controlling entry or reentry into a restricted zone due to the possibility of radiological contamination, and to minimize the radiation exposure of individuals. Control is needed to prevent unauthorized persons from entering and to allow entry by emergency workers on critical missions and those members of the general public who have essential needs to enter the restricted zone.

Access Control:

Refers to all activities accomplished for the purpose of controlling entry or reentry into a restricted zone due to the possibility of radiological contamination, and to minimize the radiation exposure of individuals. Control is needed to prevent unauthorized persons from entering and to allow entry by emergency workers on critical missions and those members of the general public who have essential needs to enter the restricted zone

Action levels:

Refers to thresholds for contamination levels that trigger the need for decontamination.

Activation:

(1) As used in this plan, the procedure of staffing and bringing emergency operations center or other key coordination facilities up to a level of operational readiness, making it fully functional for the management and support of a radiological incident response. (2) The process of making a material radioactive by bombardment with neutrons, protons, or nuclear radiation.

Activation of Personnel:

The process by which emergency response personnel are notified of an emergency situation and requested to report for duty. Activation of personnel is completed when the personnel have reported to their duty stations.

Adequate:

As used in FEMA reviews of radiological emergency plans and procedures, adequate means that the plan contents are consistent and in full compliance with the plan requirements delineated in the NUREG-0654 evaluation criteria or alternative approaches approved by FEMA.

Affected area:

A geographical area in which a release from a nuclear power plant is projected to result in radioactive exposures to the public.

Agency Lead Official (ALO):

The designated Federal official in each participating Federal agency authorized to direct that agency's response to a radiological emergency.

Air sampling:

The collection and analysis of samples of air to measure its radioactivity or to detect the presence of radioactive substances (See fall-out.)

Airborne radioactive material:

Any radioactive material dispersed in the air in the form of dusts, fumes, mists vapors or gases.

Alert:

The "Alert" classification would apply if events were in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be small fractions of the Environmental Protection Agency (EPA) Protective Action Guide (PAG) exposure level.

Alerting of personnel:

Refers to transmission of a signal or message that places personnel on notice that a situation has developed which may require that they report for emergency duty.

Alerting the public:

Refers to activating an attention getting warning signal through such means as sirens, tone alert radios, route alerting, and speakers on cars, helicopters, and boats.

Alpha detector:

An instrument designed specifically to detect alpha radiation.

Alpha particles:

Positively charged particles identical with the nuclei of helium atoms. They penetrate tissues to usually less than 0.1 mm (1/250 inch) but create dense ionization and heavy absorbed doses along these short tracks.

Assessment:

The evaluation and interpretation of radiological measurements and other information to provide a basis for decision-making. Assessments can include projections of off-site radiological impact.

- B-

Background (natural) radiation:

Nuclear (or ionizing) radiations arising from within the body and from the surroundings to which individuals are always exposed. The main sources of the natural background radiation are potassium-40 in the body; potassium-40 and thorium, uranium and their decay products (including radium) present in rocks and soil; and cosmic rays. Man-made sources may also contribute to the background radiation level.

Beta particles (b):

Charged particles of a very small mass emitted spontaneously from the nuclei of certain radioactive elements. Most (if not all) of the direct fission products emit (negative) beta particles. Physically, the beta particles are identical to electrons moving at high velocity (nearly the speed of light). Their range in air can be several feet, and in heavier material, such as the human body, they expend their energy within about 2 mm (1/10 inch).

Boiling Water Reactor (BWR):

A reactor in which water, used as both a coolant and moderator, is allowed to boil in the core. The resulting steam can be used to drive a turbine.

- C-

Code of federal Regulations (CFR):

A codification of the general and permanent rules established by the executive departments of Federal agencies. The Code is divided into 50 titles representing broad areas of activity subject to Federal regulation.

Committed dose:

Refers to the dose that will be received over a period of 50 years from the ingestion or inhalation of a particular quantity of a radionuclide or a specific mix of radionuclides.

Consequences:

The result of effects (especially projected doses or dose rates) of a release of radioactive material to the environment.

Containment:

The structure housing the nuclear reactor. The structures, within and including the reactor building, designed to prevent the escape of radiation from the reactor to the environment. The reactor containment itself usually consists of layers of reinforced steel and concrete. Containment consists of primary and secondary structures.

Contaminated:

The condition of an object or person hat has more than an established limit of radioactive material adhering to its surface. (Adhesion of radioactive particulates on individuals and objects).

Contaminated, injured or exposed individuals:

Refers to individuals who are: contaminated, contaminated and otherwise physically injured, or exposed to high levels of radiation.

Contamination (radioactive):

Deposition of radioactive material in any place where it may harm persons, spoil experiments or make products or equipment unsuitable or unsafe for some specific use. The presence of unwanted radioactive matter; the presence of radioactive material outside its normal container where it is potentially hazardous.

Controlled Zone:

(1) An area with controlled access, from which the population has been relocated, and, (2) any area to which access is controlled for the purposes of radiation safety.

Coolant:

A substance circulated through a nuclear reactor or transfer heat. The most commonly used coolant in the United States is water. Other coolants include heavy water, air carbon dioxide, helium, liquid sodium, and sodium-potassium alloy. Typically, "coolant" refers to the water that covers the core (primary coolant).

Core:

The central portion of a nuclear reactor containing the uranium fuel, surrounding structures, and coolant water, where fission reactions occur to generate heat and steam, and thus, power.

Curie (Ci):

The basic unit used to describe the intensity of radioactivity in a sample material. The curie is equal to 37 billion disintegrations per second, which is approximately the rate of decay of 1 gram of radium. A curie is also a quantity of any radionuclide that decays at a rate of 37 billion disintegrations per second. Named for Marie and Pierre Curie who discovered radium in 1898.

- D-

Decay:

Disintegration of the nucleus of an unstable nuclide by spontaneous emission of charged particles and/or photons.

Decontamination:

The operation of removal of contaminating radioactive material from a structure, area, object, or person.

Delayed health affects:

Radiation effects that are manifested long after the relevant exposure. The vast majorities are stochastic; that is, the severity is independent of dose and probability is assumed to be proportional to the dose, without threshold.

Detector:

A material or device that is sensitive to radiation and can produce a response signal suitable for measurement or analysis. A radiation detection instrument.

Direction and Control:

Refers to the management of emergency functions within a particular context (e.g. emergency operations center) through leadership and authority.

Dose:

A general term denoting the quantity of radiation or energy absorbed. For special purposes, it must be appropriately qualified. In this plan, it refers specifically to the term "dose equivalent"

Dose limits for emergency workers:

Refers to the allowable accumulated doses during the entire period of an emergency. Action to avoid exceeding the limit is taken based on actual measurements of integrated gamma exposure. In contrast, protective action guides are trigger levels of projected dose at which actions are taken to protect the public. Those actions are taken prior to the dose being received.

Dose rate:

Dose delivered or absorbed per unit of time, as rads per second or rem per hour.

Dosimeter:

A device that measures radiation dose; such as a film badge or ionization chamber.

Drill:

A drill is an event involving organizational responses to a simulated accident to develop, test, and monitor specialized emergency skills that constitute one or more components of an emergency plan or procedures.

- E-

Emergency:

Any natural or man-caused situation that results in or may result in substantial injury or harm to the population or substantial damage to or loss of property.

Emergency Action Levels (EALs):

Specific plant instrumentation readings or other applicable servable indicators that, if exceeded, will initiate classification of an accident and other response actions. For example, a reactor coolant leak rate of more than 50 gpm would trigger an Alert; whereas, a General Emergency would be declared if core damage were imminent.

Emergency Alert System (EAS):

A system or network of radio and television stations responsible for providing official government instructions to the public. (Formerly referred to as Emergency Broadcast System [EBS].)

Emergency Classification Levels (ECL):

A scheme derived to categorize a plant accident into one of four classes according to severity so that appropriate actions might be rapidly taken.

- *Notification of Unusual Event indicates that unusual events are in process or have occurred that indicates a potential degradation in the level of plant safety. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety system occurs.*

- *Alert indicates that events are in process or have occurred that involves an actual or potential substantial degradation in the level of plant safety. Releases are expected to be limited to small fractions of the Environmental Protection Agency (EPA) Protective Action Guides (PAGs) exposure levels.*

- *Site Area Emergency indicates that the events are in process or have occurred that involves actual or likely major failures in the plant functions needed for protecting the public. Releases are not expected to exceed EPA PAG exposure levels, except near the site boundary.*

- *General Emergency indicates that events are in process or have occurred that involve actual or imminent substantial core degradation or melting, with potential for loss of containment integrity. Releases can reasonably be expected to exceed EPA PAG exposure levels offsite, beyond the immediate site area.*

Emergency Operations Center

Refers to a facility that is the primary base of emergency operations for an ORO during a radiological emergency.

Emergency phase:

Refers to the initial phase of response actions, during which actions are taken in response to a threat of release or release in progress

Emergency Planning Zone (EPZ):

An area defined around a nuclear facility to facilitate offsite emergency planning and develop a significant response base. A basic EPZ is defined for the plume exposure pathway. The SQN and WBN EPZs are defined as that area within a radius of 10 miles of the plant. An Ingestion Pathway/ Planning or Ingestion Pathway Zone (IPZ) is also defined around each site. The SQN and WBN IPZs are defined as that area within a radius of 50 miles of the plant. During an emergency response, best efforts are made to use plan action criteria without regard to whether particular areas are inside or outside the EPZs.

Emergency protective actions:

Protective actions to isolate food to prevent its introduction into commerce and to determine whether condemnation or other disposition is appropriate.

Emergency worker:

Refers to an individual who has an essential mission or outside the plume exposure pathway emergency planning zone to protect the health and safety of the public who could be exposed to ionizing radiation from the plume or from its disposition. Some examples of emergency workers are: radiation monitoring personnel; traffic control personnel; evacuation vehicle drivers; fire and rescue personnel including ambulance crews; medical facilities personnel; emergency operations center personnel; personnel carrying backup alerting procedures; and essential services or utility personnel.

Evacuation:

The process of removing people from a hazardous area to a safe area. As used in this plan, evacuation refers to the urgent removal of people from an area to avoid or reduce high level, short term exposure, usually from the plume or from deposited activity. Evacuation may be a preemptive action taken in response to nuclear plant condition rather than an actual release.

Exercise:

Refers to an event involving organizational responses to a simulated commercial nuclear power plant accident with radiological and other offsite consequences. The purpose of an exercise is to test the integrated capabilities of involved organizations to implement emergency functions set forth in plans and procedures

Exposure—Exposure rate:

The most common indicators of radiation hazards are the exposure and he exposure rate, usually expressed in roentgens (R) and roentgens (R/hr). (Sometimes these terms are called the dose and dose rate). The exposure (R) actually is a measure of the ionization (i.e. electrical charges) produced in air by X or gamma radiation. Exposure rate (R/hr) provides an index of the gamma radiation energy that is "hitting" the body per unit of time. The exposure rate, thus, is a measure of the intensity of radiation decreases or increases in time. The total, or accumulated, exposure (usually just called exposure) is an indicator of the total radiation damage that has occurred. This is in contrast to the exposure rate, which is an indicator of the radiological hazard (the rate that damage is occurring) at any instant of time.

- F-

Facility

Refers to any building, center, room(s), or mobile unit(s) designed and equipped to support emergency operations.

Fallout:

Radioactive particles descending through the atmosphere from a plume cloud formed by a release of particles to the environment from a nuclear plant.

Federal Radiological Monitoring and Assessment Center (FRMAC):

A center usually established at an airport near the scene of a radiological emergency, from which the DOE Offsite Technical Director conducts the FRMAP response. This center generally need not be located near the on-site or Federal-State operations centers as long as its operations can be coordinated with them.

Federal Radiological Monitoring and Assessment Plan (FRMAP)

A plan to provide coordinated radiological monitoring and assessment assistance to the State and local governments in response to radiological emergencies. This plan, authorized by 44 CFR Part 351, is a revised version of the Interagency Radiological Assistance Plan.

Fission:

A highly energetic form of nuclear decay wherein the nucleus splits into two or (rarely) three smaller nuclei accompanied by large amounts of radiation. When a uranium atom splits, two new atoms, neutrons, and heat are produced, Fission occurs naturally, or when neutrons bombard an atom's nucleus.

Forward Operations Center

A center, either mobile or fixed, set up in a location identified in convenient to the accident site, to facilitate emergency response, for example, accident assessment activities such as direction of the field monitoring teams.

Fuel rod:

A long, slender tube that holds fissionable material (fuel) for nuclear reactor use. Fuel rods are assembled into bundles called fuel elements or fuel assemblies, which are loaded individually into the reactor core.

Fusion:

The process whereby the nuclei of light elements, especially those of the isotopes of hydrogen, namely deuterium and tritium, combine to form the nucleus of a heavier element with the release of substantial amounts of energy.

- G -

Gamma Rays (y):

Electromagnetic radiation comparable to light. They are similar to x-rays except for their origin. They are emitted with energies characteristic of each nuclide, and many are highly penetrating. Although their intensity decreases exponentially with thickness of the absorbing material, they can travel hundreds of feet in the air and penetrate completely through the body.

Geiger-Mueller Counter (G-M tube):

A type of radiation detection and measuring instrument. It consists of a gas filled (Geiger-Mueller) tube containing electrodes, between which there is an electrical voltage but no current flowing. When radiation passes into the tube and causes ionization in the contained gas, a short intense pulse of current passes from the negative electrode to the positive electrode and is measured or counted. The number of pulses per unit if time measures the intensity of the radiation. It is also known as the Geiger counter.

General Emergency (GE):

A "General Emergency" classification indicates a severe accident involving imminent or actual core damage (melt) or loss of a plant to intruders. Full mobilization of emergency response organizations is recommended along with appropriate protective actions. Radioactivity releases can be reasonably expected to exceed U.S. Environmental Protection Agency Protective Action Guide exposure levels beyond the immediate site area.

Ground contamination:

Radioactive material deposited on the ground as a radioactive cloud passes.

- H -

Half-life

The time required for the activity of a given radioactive species to decrease to half of its initial value due to radioactive decay. The half-life is a characteristic property of each radioactive species and is independent of its amount or condition. Each radioisotope has its own length of time for half-life that varies from millionths of a second to billions of years. As examples: Iodine 131 has a half life of about 8 days, Strontium-90 and cesium have half-lives of about 30 years, while the half-life of plutonium-239 is about 35,000 years.

Health Physicist:

An individual trained in radiation protection.

High exposure rate:

Rates greater than 100 milliroentgens per hour.

High levels of radiation exposure:

Doses of 100 rem or greater.

High radiation area

Any area in which a major portion of the body could receive a radiation dose of 100 millirem (0.1 rem) in one hour. These areas must be posted as "high radiation areas" and access into these areas is maintained under strict control.

-I-

Incident

An event or a series of events deliberate or accidental, leading to the release, or potential release into the environment of radioactive materials in sufficient quantity to warrant consideration of protective actions. (The term "incidents" includes accidents, in the context of this plan.)

Ingestion County:

A county that lies wholly or partially within the 50 Mile IPZ which has the potential for significant contamination form a release at a nuclear power plant, mainly through ingestion of contaminated foodstuffs.

Ingestion Exposure Pathway:

The principal exposure form this pathway would be from ingestion of contaminated water or foods such as milk or fresh vegetables. The duration of principal exposures could range in length from hours to months.

Ingestion Pathway Zone (IPZ)

That area that lies within a fifty (50) mile radius of a nuclear power plant.

Isotopes

Forms of the same element having identical chemical properties but differing in their atomic masses. Radioisotope is the unstable isotope of an element that decays or disintegrates spontaneously emitting radiation.

-J-

-K-

Key staff:

Refers to those emergency personnel, sufficient in numbers and functions, necessary to carry out emergency operations as required by scenario events and as set forth in the organization's emergency response plans

KI (potassium iodide):

A prophylactic drug that can be used effectively to block the uptake of the radioiodine by the thyroid gland.

-L-

Lactating:

Production of milk by a female animal.

Local Government

Any county, city, village, town, district or political subdivision of any state, any Indian tribe or authorized tribal organization; or Alaska native village or organization, including any rural community, unincorporated town or village or any other public entity.

Long-term exposure:

Exposure lasting more than four days.

Low exposure rate:

Refers to rates lower than 100 milliroentgens per hour.

Low level waste

Discarded radioactive material that is only slightly or moderately contaminated.

-M-

Mass care:

The provision of care to large numbers of persons who, because of the nature of a disaster and its effects upon the habitability or accessibility of their homes, need to be sheltered fed, and provided health care and other services in facilities such as schools, meeting halls, churches, etc.

Megacurie

One million curies

Megawatt

The unit by which the rate of production electricity is usually measured: one megawatt equals one million watts or a thousand kilowatts.

Meltdown

A type of nuclear accident in which the fuel becomes so overheated, usually as a result of coolant, that it melts through the metal cladding on the fuel rods and falls into the base of the reactor vessel.

Monitoring, Radiological:

The operation of locating and measuring radiation and radioactive contamination by means of survey instruments that can detect and measure ionizing radiations.

-N-

National Contingency Plan (NCP):

An operation plan required to outline the Federal response to radiological emergencies at commercial nuclear power plants. In executive Order 12241, the President delegated to FEMA the responsibility for the development and promulgation of such a plan in response to Public Law 96-295.

National Response Plan Nuclear/Radiological Incident annex (NRP-N/RIA):

The NRP-N/RIA is to be used by Federal agencies in peacetime radiological emergencies. It primarily concerns the offsite Federal response in support of State and local governments with jurisdictions for the emergency. The NRP-N/RIA: (1) Provides the Federal government's concept of operations, based on specific authorities for responding to radiological emergencies; (2) outlines Federal policies and planning assumptions that underlie this concept of operations and on which federal agency response plans (in addition to their agency –specific policies) are based; (3) specifies authorities and responsibilities of each Federal agency that may have a significant role in such emergencies. The NRP-N/RIA includes the FRMAP for use by Federal agencies with radiological monitoring and assessment capabilities.

National warning System (NAWAS):

In place telephone and radio communications established for warning governmental agencies in the event of a nuclear attack on the United States; this system can be used as a back-up system for other emergencies.

Notification and mobilization of personnel:

Refers to the transmission of messages to emergency personnel informing them of an emergency situation and directing them to report for emergency duty at their assigned duty stations.

Nuclear

Technically, an adjective referring to the atom's nucleus. Commonly, refers to radioactive processes that involve the disintegration of the nucleus, as in "nuclear particles," and "nuclear energy"

Nuclear Power Plant (NPP):

Any device, machine, or assembly that converts nuclear energy into some form of useful power, such as mechanical or electrical power. In a nuclear electric power plant, heat produced by a reactor is generally used to make steam to drive a turbine that in turn drives an electric generator.

Nuclear reactor:

A device in which a fission chain reaction can be initiated, maintained, and controlled. Its essential component is a core with a fissionable fuel. It usually has a moderator, shielding, coolant, and control mechanisms.

-O-

Offsite

The area outside the boundary of the onsite area; any territory not within the confines of a nuclear power plant site.

Onsite:

The area within the boundary established by the owner or operator of a fixed nuclear facility; the area included inside the perimeter fence of a nuclear power plant.

Operator:

The operator of a nuclear power plant, such as TVA at SQN and WBN.

-P-

Plan:

Refers to an organization's documented concept of operations and implementing procedures for managing its internal response and coordinating its external response with other organizations to radiological emergencies.

Plume:

A plume is created by release of radioactive materials that form into an invisible cloud-like formation, and the size of a plume depends on the length of time a release occurs. Movement is based on meteorological conditions such as wind speed and direction. "Fallout," or the amount of deposition of radioactive materials on ground, is predicted on two factors: (1) the rapidity of movement of the plume; and (2) precipitation falling through the plume. While a fast moving plume would create a widespread "footprint" of less contamination, a slower moving plume with precipitation occurring would create a "hotter" more localized footprint. There are two types of releases:

(1) Puff Release: This is a release of rather short duration that creates a cloud of relatively small dimensions.

(2) Continual Release: A longer- term release that creates a plume of larger dimensions.

Plume Exposure Pathway:

The principal exposure sources from this pathway are: (a) whole body external exposure to gamma radiation from the plume and from deposited materials; and, (b) inhalation exposure from the passing radioactive plume. The duration of principal potential exposures could range in length form hours to days.

Portal monitor:

A radiation monitor consisting of several radiation detectors arranged in a fixed position within a frame that forms a passageway for individuals being monitored.

Power reactor:

A reactor designed to produce useful nuclear power, as distinguished from reactors used primarily for research or for producing radiation or fissionable materials.

Preventative protective actions:

Refers to ingestion measures that may be taken to prevent or reduce contamination of milk, food, and drinking water. Other preventative actions are washing, scrubbing, or peeling fruits and vegetables to remove surface contamination.

Projected dose:

An estimate or calculated amount of the radiation dose which affected individuals could receive over a period of time from exposure to the plume and/or deposited materials if protective actions are not taken; future dose calculated on the basis of estimated or measured initial concentrations of radionuclides or exposure rates.

Protective actions:

An activity conducted in response in response to an accident or potential accident to avoid or reduce radiation dose to members of the public (sometimes referred to "protective measure").

Protective Action Guidelines (PAGs):

The U.S. Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA) recommended projection doses at which various protective actions are warranted. These are doses that would be received if no protective actions were taken. They do not indicate any dose received prior to the time of projecting the dose.

Protective clothing:

Special clothing worn by a radiation worker to prevent contamination of his body or his personal clothing.

Protective Response:

Implementation of a protective action.

Public Information:

All information of interest that will assist the public in reacting responsibly to a disaster solution, such as: (a) Emergency information brochures distributed to residents of the 10-Mile EPZs at SQN and WBN; (b) information regarding the existing situation in the event of a disaster; (c) actions that have been, or will be taken by emergency officials;; and (d) actions to be taken by the residents of the area to minimize the loss of life or property.

-R-

RAD:

The unit of absorbed dose of radiation in body tissue or other material.

Radiation:

As used in nuclear terminology, radiation refers to energy propagated in the form of high frequency electromagnetic waves; energy traveling in the form of waves, particles or bundles called "photons." Radiation is emitted at one point and received at another. It may be Alpha, Beta, or Gamma.

Radioactive:

Exhibiting radioactivity.

Radioactive contamination

Deposition of radioactive material in any place where it may harm persons or equipment.

Radioactivity:

The property of certain nuclides of spontaneously emitting nuclear particles or gamma or x-ray radiation, or of undergoing spontaneous fission. A process by which unstable atoms of an element emit excess energy in the form of waves or particles as the element changes (or decays) to atoms of a different element or to a lower energy form of the same element.

Radiological:

A general term referring to processes that involve nuclear radiation.

Radiological emergency:

A type of radiological incident that poses an actual or potential hazard to public health or safety or loss of property.

Reactor, Nuclear:

A device in which nuclear fission may be sustained and controlled in a self –supporting nuclear reaction. The varieties are many, but all incorporate certain features, including fissionable material or fuel, a moderating material (unless the reactor is operated on fast neutrons), a reflector to conserve escaping neutrons, provisions for removal of heat, measuring and controlling instruments, and protective devices.

Reactor vessel:

The principal component of the reactor coolant system, it contains the heat-generating core. Outlet and inlet nozzles on the vessel provide for the exit of heated water and its return to the vessel interior for recirculation through the core. The vessel is cylindrical with a hemispherical bottom and flanged, removable upper head. Made of carbon steel with a 1/8 inch internal cladding of stainless steel, the vessel is about 44 feet tall and 14 feet in diameter.

Recovery:

The process of reducing radiation exposure rates and concentrations in the environment to acceptable levels for return by the general public for unconditional occupancy or uses after the emergency phases of radiological emergency.

Reentry:

Temporary entry into a restricted zone under controlled conditions.

Release:

Escape of radioactive materials into the uncontrolled environment.

Relocation:

A *protective action, taken in the post–emergency phase, through which individuals not evacuated during the emergency phase are asked to vacate a contaminated area to avoid chronic radiation exposure from deposited radioactive material.*

REM:

Stands for "Radiation Equivalent Man"—a measure of radiation that indicates potential impact on human cells. Also, the unit of dose equivalent in body tissue. It is equal to the absorbed dose (measured in rads) multiplied by the quality factor (which takes into account the effectiveness of different types of radiation) and by other multiplying factors.

For beta and gamma radiation, the quality factor is 1. Frequently, radiation dose is measured in millirems for low-level radiation.

Restricted area:

Any area to which access is controlled for protection of individuals from exposure to radiation and radioactive materials

-S-

Sampling:

Refers to collecting specimens of materials (e.g. particles or radioiodine in the air) at field locations.

Shelter:

(1) A structure or other location offering shielding from nuclear radiation in the environment; and (2) a school or other building which is locate at least 15 miles from a nuclear plant and is utilized as living quarters for persons required to leave an endangered area.

Shelter in Place:

A protective action which includes going indoors, listening to an EAS radio or television station, closing all windows and doors, closing exterior vents, and turning off heating and air conditioning equipment using outside air.

Shielding:

A mass of material that blocks radiation, thereby protecting personnel, equipment or nuclear experiments from radiation injury, damage or interference.

Shutdown"

A decrease in the rate of fission (and heat production) in a reactor (usually by the insertion of controls rods into the core.)

Site:

A nuclear power plant site.

Special populations:

Groups of individuals with physical or mental handicaps that need assistance when protective actions are implemented.

Survey:

A study to: (1) find the radiation or contamination level of specific objects or locations within an area interest and, (2) locate regions of higher than average intensity, i.e. hot spots.

-T-

Traffic control:

All activities accomplished for the purpose of facilitating the evacuation of the general public in vehicles along specific routes.

-U-

Uranium

A radioactive element with the atomic number of 92, and as found in natural ores, an atomic weight of approximately 238; which makes it the heaviest natural element. The two principal natural isotopes are uranium-235 (0.7% of natural uranium), which is fissile, and uranium-238 (99.3% of natural uranium), which is fissionable by fast neutrons and is fertile. Natural uranium also includes a minute amount of uranium-234. U-235 is the basic fuel of nuclear reactors and is enriched from less than one percent up to 3 percent for commercial nuclear fuel.

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